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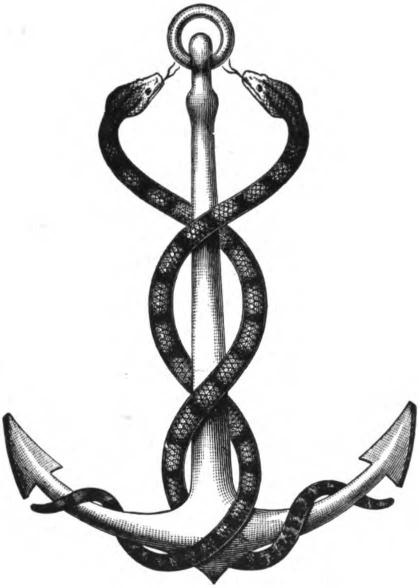
# THE DIAGNOSIS AND TREATMENT
OF
# INTUSSUSCEPTION



NUNQUAM ALIUD NATURA, ALIUD SAPIENTIA DICIT.

# THE
# DIAGNOSIS & TREATMENT
# OF
# INTUSSUSCEPTION

BY

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# PREFACE

THIS book is based entirely on the experience I have gained in treating a large number of cases of Intussusception during the last thirteen years.

It does not pretend to be an exhaustive treatise on the subject. It aims chiefly at being practical, and deals mainly with diagnosis and treatment—Irrigation and its limitations being especially noted.

If it is found to be of any service to young practitioners, my object will have been attained.

THE AUTHOR.

SYDNEY, *October* 1906.

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# THE DIAGNOSIS AND TREATMENT
OF
# INTUSSUSCEPTION

# INTUSSUSCEPTION

## CHAPTER I

### MAINLY INTRODUCTORY

INTUSSUSCEPTION—*i.e.* invagination of part of the intestinal tract into the lumen of the gut just below it—has been known and recognised as a cause of intestinal obstruction from time immemorial. In some old books we find it called "Introsusception," and at one time it was confounded with volvulus.

John Hunter did not make this mistake. It seems that the second paper he read before the Society for the Improvement of Medical and Chirurgical Knowledge was on Introsusception. Hunter's clear and minute description of the mechanism and anatomy of intussusception could hardly be improved upon at the present day. His treatment was weak. He did not approve of the treatment then sometimes adopted of giving quicksilver, but suggested the administration of "vomits" with a view to invert the peristaltic action of the containing gut. Mr. Heath, in his

Hunterian Oration, referring to this paper, says: "It is remarkable that neither inflation of the bowel from below, which dates from Hippocrates, nor the proposal of Praxagoras to open the abdomen and thus reach the seat of the trouble, which in modern times has proved so successful, receive any mention in this essay."

In his *Clinical Lectures*, Trousseau, when discussing this subject, tells us that in the year 1676 Paul Barbette, a surgeon of Amsterdam, very distinctly suggested opening the abdomen in obstinate volvulus, or intestinal intussusception. But it does not appear that this very rational mode of treatment was carried out by anybody at that time or for many years after. Indeed, it is not until 1871 that we find a record of an abdominal section for intussusception. A successful case of laparotomy for intussusception in a child was then recorded by Mr. Jonathan Hutchinson.

To Mr. A. E. Barker[1] belongs the honour of putting the treatment of intussusception on a rational basis. It was in 1888 (now eighteen years ago) that his first paper on the subject appeared. He then argued very forcibly on the importance of operating early. At that time, although he did not pretend to have made an exhaustive search, he could only find records of 73 cases that had been operated upon. Only 12 of these had recovered; 23 of the cases were in children, and of these only 5 had recovered—a mortality of 78·2 per cent. This was not very encouraging, and it was, doubtless, the fearfully high death-rate that made men reluctant to operate. So it was only undertaken, as a last resource, several days after the onset of symptoms, generally when it was clear, even to the uninitiated, that death would take place. Under such circumstances, how was it possible for the death-rate to lessen? It was only when men were able to see and appreciate the fact so strongly urged by Mr. Barker, that laparotomy could not be performed too early in any case, after irrigation had failed, that any improvement took place.

---

[1] *Lancet*, London, 1888, August 11.

Old superstitions and old methods of treatment die hard. Men's fixed opinions are not changed in a day, so it was only quite gradually that men were persuaded to do as Mr. Barker told them. Indeed, I do not see how we could expect the general body of the medical profession to see the importance of early operation, when they are told in all the text-books of the day that operations on children in these cases were dangerous and only to be performed as a last resource, and that the few successful cases recorded must be regarded as surgical curiosities.

Day[1] says: "Surgical treatment consists in performing the operation of gastrotomy when all other measures have proved unavailable." What are *all* the other measures? "It seems certain that if the operation holds out any chance of success it should not be delayed over three or four days, when the symptoms are severe."

---

[1] *Diseases of Children*, London, 1885.

Henoch[1] "recommends the trial of iced enemata every one or two hours. In rare cases, reduction is said to have been produced by hanging the child up by the legs and by massage of the abdomen, patient being under chloroform. In desperate cases laparotomy, with reduction of the intussusception and the formation of an artificial anus, has been often performed, but only very rarely with success. The reason for this want of success is that even when the intussusception was found it was nearly always impossible to draw the invaginated portion out of its sheath. As it is impossible to establish any definite indication as to the exact time when laparotomy should be performed, the physician who risks this operation must himself incur responsibility for the result. Braun has advised operating on the first or second day of disease, if possible, because reduction may probably still be effected at that time; but the objection to this is that the diagnosis is generally very uncertain in these early stages."

Even Mr. Jonathan Hutchinson, in 1892, who had, twenty years before, operated successfully on a child for intussusception, was afraid of laparotomy.[2] When discussing methods of procedure, he says: "If the patient be an infant, say under two years of age, it will be well to be content with repeated attempts by injection. The results by laparotomy, in infants, have been so almost invariably fatal that it is safer to trust to other measures."

---

[1] *Lectures on Diseases of Children*, translated from 4th Ed., New Sydenham Society, 1889, vol. ii.

[2] *Arch. Surg.*, London, vol. iv.

Later still, the writer on Intussusception in the *American Text-book on Diseases of Children* (1894), speaking about operations, says: "In cases of acute intussusception, it has no effect in diminishing the death-rate. The objections to the operation in acute cases are that there is a reasonable chance of recovery without it." He goes on to say: "I am well aware that a few brilliant results from laparotomy in infants have been recorded by Mr. Hutchinson and the late Dr. Sands, of New York, and other operators, but these cases should be regarded as surgical curiosities, showing what infants may sometimes safely endure, rather than as furnishing precedents for future guidance."

However, the seed sown by Mr. Barker in 1888 did not all fall on barren ground; it found some fertile patches and began to multiply. Certainly it had been watered by Mr. E. W. Roughton and others from time to time. At all events, in the next ten years we find, scattered through the various medical journals of the world, records of cases of intussusception cured after laparotomy.

But in 1895 successful cases were still rare. In March 1895 Mr. Roughton[1] could only find records of 16 successful cases of laparotomy for intussusception in infants. This can hardly be considered a complete list. There must have been at that time many other successful cases unrecorded. As a matter of fact, in 1895, I had myself operated successfully on 4 cases.

---

[1] *Lancet*, London, 1895, vol. i.

In 1897 Mr. Bernard Pitts[1] was able to record 7 consecutive cases of operation in children, with 6 recoveries.

Mr. G. Heaton, in 1899, in his paper on "Intussusception,"[2] mentioned 47 operations, with a death-rate of 63·6.

At the Annual Meeting of the British Medical Association in 1901, during the discussion on the treatment of intussusception in children, Mr. Pitts demonstrated the great increase in the number of cases and a great decrease in the mortality after operation at St. Thomas's Hospital.

In 26 years there were 115 cases of all ages.

From 1875 to 1894 inclusive there were 43 cases; 14 laparotomies, 1 recovery (a child of eight years).

From 1895 to 1900 inclusive there were 72 cases; 62 laparotomies, 23 were cured and 39 died.

Mr. Keith Monsarrat,[3] by grouping together cases from tables furnished by Gibson, Wiggin, Barker, Pitts, Eve, and D'Arcy Power, obtained a total of 374 cases that had been operated upon; 181 were cured and 193 died—showing a mortality of 51·7 per cent.

Since that time everywhere there has been a large increase in the number of intussusceptions sent into hospital for treatment, while the mortality has at the same time steadily decreased.

---

[1] *Lancet*, London, 1897, June 12.

[2] *Brit. Med. Journ.*, London, 1899, vol. i. p. 957.

[3] *Med. Annual*, Bristol, 1892.

Mr. Barker[1] has treated 25 cases at University College Hospital, with a mortality of 28 per cent.

Mr. H. Fagge[2] has lately reported 18 cases, with only 7 deaths. Mortality, 39 per cent.

Mr. Cuthbert Wallace,[2] 20 cases — 4 deaths. Mortality, 20 per cent.

The cases I personally have operated upon amount to 124, with 40 deaths. Mortality, 32·2 per cent. (A hundred of these have already been recorded.[3]) In the last 24 cases, there were 3 deaths—a mortality of only 12·5 per cent.

Can we expect this low death-rate to be maintained or improved upon? Yes, I think so, if we get the cases early.

Medical men are now much more alert than they used to be. Formerly, it was extremely rare to get a case sent into hospital until two days had elapsed from the onset of symptoms. Now it is common enough to get cases sent in a few hours after the symptoms have been first noticed.

The great increase in the number of intussusceptions admitted to hospital everywhere in the last few years does not indicate that intussusception is now more common than formerly; it shows that men are becoming better educated and more careful, and more often recognise these cases at first sight. Many children's deaths from intussusception in former years were, without doubt, signed up as from Colitis, Dysentery, Convulsions, etc.

---

[1] *Trans. Clin. Soc. London*, vol. xxxi.

[2] *Ann. Surg.*, Phila., 1905, March.

[3] *Brit. Med. Journ.*, London, 1905, vol. i.

It must be very difficult for the medical man, who perhaps has not met with a case during his student days, or heard a clinical lecture on the subject, and whose sole knowledge of intussusception has been gained from a text-book on surgery he read for his exam., to recognise a case of this sort when first he meets it. The text-books, as a rule, do not lay stress enough on certain symptoms, and perhaps too much on others. It is probable that a man whose knowledge of this subject has been derived from text-books would expect to find without difficulty a definite tumour in the abdomen in all cases. He would also, I think, expect to find the child looking very seriously ill. Now often in the early stages these children do not appear to be ill; very often it is not possible to make out any tumour unless the child is under an anæsthetic.

# CHAPTER II

## WHAT IS INTUSSUSCEPTION ?—ETIOLOGY—PATHOLOGY—VARIETIES

*What is Intussusception?*—Mr. E. Owen,[1] in his inimitable style, has answered this question so aptly and clearly, that I cannot do better than quote his words for the benefit of those who may have missed seeing them :—" No difference of opinion could arise in answering this question verbally, though I notice in examination work that there is sometimes a little difficulty with the spelling. Except for this the word would be quite excellent. As its dissection shows : 'intus,' *within*, and 'susceptum,' *caught up*, the past participle of 'suscipio,' from *sub* and *capio*. That is to say, intussusception means the catching up of one piece of bowel within another piece.

" Sometimes, when one is pulling off an overcoat with rather a tight cuff, the lower part of the sleeve becomes 'caught-up-within' the higher, so that, at that particular level, there are three layers of overcoat sleeve, which is in consequence temporarily shortened. This is a true intussusception, and the best way to deal with it is by drawing down the cuff and holding on to it whilst the arm is being gently drawn out. The difference between the caught-up coat sleeve and an intestinal intussusception is that, while the coat sleeve is intussuscepted from below upward, the intestinal catching-up-within is from above, downwards; for the simple reason that the peristaltic action of the circular fibres of the bowel is from above, downwards; and it is by the energetic contraction of these circular fibres that the intussusception is produced."

---

[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

Sir Frederick Treves, in his book on *Intestinal Obstruction*, says: "If an intussusception be viewed in vertical section, it will be seen to be composed of six layers of intestine, three on each side of the central canal, all more or less parallel to one another. It will be noted, also, that the arrangement of the layers is such that mucous membrane lies in contact with mucous membrane and peritoneum with peritoneum. On horizontal section, the invaginated mass will show three concentric rings of bowel, with of course the same mutual relations with regard to the mucous and serous surfaces.

"All parts of the intussusception are named, and the nomenclature has suffered somewhat from an exuberance of terms. The external of the three layers is known as the 'Intussuscipiens,' the sheath or receiving layer (*la gaîne* of the French). The innermost cylinder is known as the 'Entering' layer, and the middle one as the 'Returning' layer. Taken together these two layers form the intussusceptum (*le boudin* of the French). The 'neck' of the intussusception is at its upper part, where the returning layer joins the sheath. The ridge formed by the junction of these two layers is known as *le bourrelet.* The apex of the intussusception is at the lower part of the intussusceptum, where the entering and returning layers join. . . . All intussusceptions are complete in the sense that the intussusceptum is composed of all the coats of the bowels, and that it enters the sheath evenly and equally."

An intussusception may take place at any part of the intestine from the duodenum to the rectum, but by far the most frequent situation for it to start is at the cæcum or in the ileum a few inches above the cæcum. In my cases the most frequent starting-point was at the caput cæci. And I found that when it started in the ileum it always began at the side of the bowel and opposite the mesenteric attachment.

The Etiology of Intussusception is still somewhat obscure. Mr. D'Arcy Power, in the "Hunterian Lectures on the Pathology and Surgery of Intussusception" delivered in 1897, inclined to the opinion that a disproportion between the width of ileum and cæcum was one of its main causes. His conclusions are: "The evidence derived from anatomical, physiological, pathological, and clinical data render it legitimate to assert that spontaneous ileo-cæcal intussusceptions occur where the colon is considerably larger than the ileum, and is so unduly movable that it readily allows itself to become invaginated when once the process has begun. This variety of intussusception is essentially an affection of childhood; and such an undue increase in the width of the colon implies either a congenital abnormality or an unduly rapid growth, for at birth the diameter of the large intestine is practically the same as that of the ileum. Such a rapid increase in the width of the large intestine may, perhaps, in some instances render the ileo-cæcal valve less competent to guard the end of the ileum, because the valve is not capable of very rapid growth if it is to be firm, but this is probably a factor of very rare and subordinate importance.

"Though anatomical peculiarities are important factors in the production of an intussusception, the physiological factors are no less important, for they apply in all probability to every form of spontaneous invagination, whether it is of the enteric variety, the ileo-cæcal, or the colon. The physiological factor is much less easy to specify than the anatomical, for it is almost certainly an individual peculiarity. It may be stated broadly, however, that as regards the ileocæcal portion of the intestine the increased mobility, coupled with the unduly rapid growth in the width of the large intestine, is probably associated with increased and irregular peristaltic movements of the large intestine."

Since it is well known now that the ileo-cæcal variety, pure and simple, is not nearly so common as it was at one time thought to be, and since there is no disproportion in the size in the lumen of the bowel (in those intussusceptions commencing in the ileum, or in the colon), we must, I think, admit that the physiological is a more important factor than the anatomical one.

Nothnagel[1] goes very fully into the question of Etiology of Intussusception. He is of opinion that in the majority of cases "it must be admitted that spasm is the primary condition, or that conditions exist which favour the mechanical invagination of the bowel." "If I understand this matter correctly, true sequence of events is the following. While the bowel is performing normal peristaltic movements, an annular and strictly local constriction of the bowel happens to occur. This constriction may be greater than normal and so pronounced that the limit of physiologic invagination is exceeded and the first degree of pathologic intussusception develops, exactly in the same manner as it has been seen to do in our experiments. It is quite unnecessary to invoke any primary 'causative' factor—all that is needed is a simple increase in the intensity of the normal movement of the bowel, which of itself is sufficient to produce this dangerous condition. On this basis, too, the great predominance of invagination of the bowel in early childhood can be satisfactorily explained, for it is usually admitted that at this age the bowel is more irritable and more motile than in later life. The proof of this assumption is that the so-called agonic form of invagination is most frequently found in the bodies of children.".

---

[1] *Diseases of the Intestines and Peritoneum.*

And Sir Frederick Treves says: "There is practically unanswerable evidence to show that intussusception is brought about by irregular action in the muscular wall of the intestines."

When once the intussusception is well started it is easy to understand the symptoms produced, the reason of the obstruction, the changes that take place in the bowel, and how very soon they become irreducible. The entering mesentery soon gets stretched and twisted, thus producing venous engorgement. The distended veins give way and blood is soon poured out on the surface and below the mucous coat. The intussusceptum swells and becomes hard. It is this swelling and thickening of the first part of the bowel to be folded in (apex of the intussusception) that causes the difficulty in effecting reduction and sometimes makes it impossible. Nearly all writers on this subject speak about adhesions, and say that intussusceptions become irreducible on account of adhesions between the peritoneal surfaces. Treves says: "Irreducibility very commonly depends upon adhesions. . . . In chronic intussusceptions they are present in about 80 per cent of cases. In acute invagination, adhesions are as often absent as present. Indeed they would appear to be more often absent than present; for an examination of nearly sixty recorded instances of the acute form that I have collected myself, shows the presence of adhesions in about 45 per cent only of the cases."

Dr. F. H. Cole[1] states that adhesions take place especially along the concave side of the intussusception. In one case firm adhesions were found at the end of twelve hours.

For my own part, I must confess I have never seen any adhesions in any of the 124 cases I have handled, although I have looked for them. There has often been very great difficulty, just at the very end, in getting the stiff, swollen, thickened intestine to unfold. The surface of the bowel has often been maroon-coloured. The peritoneal surface has been rough and granular-looking at the starting-point, especially when it began at the caput cæci or in the ileum a few inches above the cæcum. In the irreducible cases, too, after the intussusception has been resected, I have never seen anything that could be called an adhesion. The intussusception has often been irreducible, even after removal, but this has always been due to swelling and thickening of the intussusceptum making evolution almost an impossibility.

## VARIETIES

I think it is evident, even at the risk of getting somewhat complicated nomenclature, that the time has arrived when some fresh classification must be adopted. Hitherto in all statistics the ileocæcal variety has always largely predominated, perhaps because men have not troubled to differentiate the various forms of intussusception in which the cæcum is involved.

---

[1] *Intercolon. Med. Journ. Australasia,* Melbourne, 1904, Nov. and Dec.

If I adhere to the old and well-known classification, the cases I have operated on must be arranged thus in order of frequency :—

| | Cases. | Died. | Cured. |
|---|---|---|---|
| Ileocæcal . . . | 77 | 24 | 53 |
| Double . . . | 29 | 9 | 20 |
| Ileo-colic . . . | 14 | 5 | 9 |
| Colic . . . | 3 | 1 | 2 |
| Enteric . . . | 1 | 1 | ... |
| | 124 | 40 | 84 |

In this classification, the term "Ileocæcal" has been used for all intussusceptions starting at the cæcum: no distinction has been made between those starting at the valve and those at the caput cæci. On going over my notes, I find that out of the 77 cases called "Ileocæcal," no less than 42 started at the caput cæci. There can be no doubt about this, because the head of the cæcum in these cases was the last part to unfold, was always thickened, and had the well-known dimple often so difficult to press out.

Mr. Corner,[1] in his most interesting paper, has suggested that this variety should be called "Colic-Ileocæcal." Is not "Cæco-Ileocæcal" a better term?

---

[1] *Ann. Surg.*, Phila., 1903, Nov.

Then we have varieties of the double forms, which can generally be easily distinguished when being reduced. In one form, after the cæcum has been completely unfolded, the intussusception of the ileum can plainly be seen, starting close to, or perhaps some inches away from, the cæcum. This variety Mr. Corner and Mr. Wallace call "Enteric-Ileocæcal."

In another double variety, after unfolding the cæcum, we can still feel the intussuscepted ileum which has gone through the valve in the colon; this has to be pushed and sometimes gently pulled upon before it is coaxed out, and has then to be reduced. This variety is called the "Ileocolic-Ileocæcal."

To make these varieties clear I place those I have met with in a table below in order of frequency :—

| | | | | |
|---|---|---|---|---|
| 1. Cæco-Ileocæcal (or Colic-Ileocæcal) . . | 42 | cases or | 33·06 | per cent. |
| 2. Ileocæcal . . . | 35 | ,, | 28·2 | ,, |
| 3. Enteric-Ileocæcal . | 22 | ,, | 17·7 | ,, |
| 4. Ileo-colic . . . | 14 | ,, | 11·2 | ,, |
| 5. Ileocolic-Ileocæcal . | 7 | ,, | 5·6 | ,, |
| 6. Colic . . . | 3 | ,, | 2·4 | ,, |
| 7. Enteric . . . | 1 | ,, | 0·8 | ,, |

This table shows that in my series of cases, cæco-ileocæcal (those starting at the caput cæci) were the most common of all varieties. But Mr. Corner calls this variety a double intussusception. If it is to be so considered, then these 42 cases must be added to the other 29 cases of the double variety, thus bringing the double intussusceptions up to 71, or 57 per cent of the whole number.

# CHAPTER III

## SYMPTOMS—DIAGNOSIS

THE very sudden onset in a previously healthy baby ~~is~~ a peculiarity of intussusception. The child is seized quite suddenly, screams, turns pale, vomits, and in a short time seems to recover itself, only to cry again at intervals as if in pain. Soon after the first scream it may pass a normal motion. In from two to ten hours, in the great majority of cases (97 per cent), blood will be passed per rectum. The mass, which varies much in size and position, can nearly always be made out by careful palpation when the child is under an anæsthetic. The child may not look ill, its pulse-rate may be hardly raised, and its temperature may be normal.

It is of the utmost importance that these cases should be diagnosed early. They should always be diagnosed when first seen by the doctor. If the case is not "spotted" at once (*i.e.* on the first attendance of child at the Casualty or O.P. Room of a hospital, or at the doctor's house, or, in the case of well-to-do people, on the doctor's first visit), valuable time will be lost and the chances of the child's recovery very considerably reduced. Among the poor an intussusception missed at the first attendance always means a delay of twelve, and very often of twenty-four hours. It is easy enough to diagnose a case of intussusception when the symptoms have existed for three days. At this period the child will look very ill, its pulse will be quick, and its temperature will be raised. There will be the usual history of a sudden onset, vomiting at frequent intervals, straining, and the passing of blood and mucus in the place of fæces. Then, if an examination is made, there will be the very obvious tumour on the left side of the abdomen or in the rectum. But generally, under such circumstances, the diagnosis is useless. It is too late. The time for any hopeful treatment is swiftly passing, if it has not passed. The large majority of cases, if left until they get into this condition, will die. They are already poisoned; they have no resisting power, and rarely recover from the shock of a laparotomy. Yet case after case is sent to the hospital in this condition. We still get children brought into the hospital in this pitiable condition, though not nearly so frequently now as in former years; and in nearly every instance we find, on inquiry, that the child has been taken to a doctor within a few hours of the onset of symptoms, and has been "treated" by him for the two or three days that have elapsed since the child was first taken ill.

These cases must be diagnosed early. It is hard to understand how they can be missed, if ordinary care is exercised.

The general appearance of the child is, I feel sure, frequently the cause of mistakes in diagnosis being made by many men. Children in the early hours (six to twelve) of intussusception often do not look sick. Men cannot bring themselves to believe that these healthy-looking, and perhaps laughing, babies can have intestinal obstruction. Yet such is often the case. The child at the first onset turns pale, looks very ill, and screams; but it is wonderful how quickly some of them recover themselves. They cry only at intervals, when they get the gripping pains, as the intussuscipiens makes fresh attempts to force along the intussusceptum. If you want to avoid falling into error, I advise you always to listen to the story of the mother when she comes to you with her baby. Some men discount everything told them by children's parents and attendants, and so, going entirely on the appearance of these intussusception children, are misled. We must be guided to a large extent by the history we get from the mother. In no other disease does it convey so much, to those that have ears to hear. The history is nearly always something to this effect. The baby was quite well, when suddenly (often just after taking the breast or after passing a motion) it screamed or cried out, turned pale, and soon vomited. We are often told that the screaming only continued for a short time, that the pallor soon disappeared, but that the child seemed to be uneasy and got frequent attacks of pain. We find on inquiry that it passed a natural motion soon after the first screaming fit. When the child is first seen by the doctor, it has almost certainly been passing blood by the bowels. And it is this that has frightened the mother. In intussusceptions we almost invariably get a history of blood having been passed at a variable period (from two to ten hours) after the onset of symptoms. The mother thinks nothing of the sudden screaming of the child, or of its turning pale; perhaps she has forgotten all about it, until you remind her by your questions. Babies often scream and get pale and vomit, and the mother thinks nothing of it. But directly she sees blood in the motion she knows something is wrong, and hurries off to a doctor as soon as possible. When you are told by a mother that her child has been passing blood, you should always ask certain questions before you send it away. If you are told that the child was quite well until a few hours ago, when it screamed, turned pale, and vomited; that it has been fretful and has vomited a few times since, and that it has just passed some blood, you can be morally certain that you have a case of intussusception to deal with; and instead of sending the child away after ordering it some castor oil, you must proceed to verify your diagnosis, by careful examination. An extraordinarily large number of cases with this perfectly clear, straightforward, definite history are missed, and so only come into hospital when the chances of their recovery are of the slenderest. This is the sort of history our house surgeons so often obtain from the mother: "Baby was quite well till three days ago, when he was taken bad quite suddenly in the morning. He screamed and sicked up his bottle, was very fretty all day, kept crying and drawing up his leg; in the afternoon what came from him was pure blood. I was frightened and took him straight to the doctor. He looked at him and said, 'Give him a dose of castor oil.' I did, but he threw it up. Took him to the doctor next day, 'cause he seemed no better, and kept passing blood and straining. He looked at him and gave me a bottle of medicine. To-day, when I went, he could see the child was very much worse. He felt his stomach, and sent me straight here with a note." With such a clear history, every child should be examined when first seen. If the doctor is too busy to examine such cases he should send them at once to a hospital as suspected intussusception. I wonder how many children all over the world have been sacrificed in this way, with a dose of castor oil and a bottle of medicine. If men would only listen and pay attention to the story told them by the mother, very few intussusceptions would ever be sent away undiagnosed. The suddenness of the attack in a child previously quite well; the scream followed by the pallor, sometimes described as "fainting" or "stiffening" out; then the subsequent vomiting and straining; fits of crying from time to time, intervals when the child seemed all right—with these facts before him, even without the story of any passing blood, the doctor should strongly suspect intussusception.

These cases are sometimes missed by men who have suspected intussusception and have examined for it. They feel the abdomen, and even make a rectal examination. The child is probably screaming when they are examining the abdomen, so it is not surprising that they detect no tumour; then they find nothing in the rectum because the mass has not had time to get there. After this examination with negative results, and seeing that the child does not look at all ill, they persuade themselves, despite the history, that it cannot be a case of intussusception.

In some text-books the mass in the rectum is mentioned as the diagnostic sign. As an aid to diagnosis in the early stages of the disease this symptom is valueless, because, as a matter of fact, the mass so rarely reaches the rectum within twenty-four hours of the onset. Of what use is it then as a diagnostic sign? It is only a trap to catch the unwary, and is quite useless as an aid to diagnosis at the stage when every intussusception ought to be recognised.

Although the onset is nearly always sudden and in a child previously well, we must remember that intussusceptions may take place during a diarrhœa. I have met with a few such cases. We should suspect intussusception when we are told that the child, who had had diarrhœa for some days, seemed suddenly to get worse, to be in much pain and vomited; and that after a few hours the motions, instead of being blood-stained mucus and fæces, contained much more blood and very little, if any, feculent material. With this report from a nurse or mother we should carefully examine in the usual way for an intussusception.

It may sometimes be difficult to distinguish between intussusception and acute colitis, in cases where the meso-colon is thickened and feels very like the intussusception tumour; but the difficulty should not be insuperable if the case is carefully gone into. The onset in both cases may be sudden, but in intussusception after a few hours the obstruction is generally complete; whereas in colitis there are frequent motions mixed with blood and slime. The tumour in cases of colitis is generally much longer and less definite in shape than in intussusception; and, although the mass can be made out low down in the abdomen on the left side, it can never be felt as a mass in the rectum. As the prognosis in cases of acute colitis is very bad if any mass has been made out, the young practitioner is advised to get a second opinion in order to save his reputation, otherwise it may afterwards be said that he has allowed a case of intussusception to die unoperated.

# CHAPTER IV

## EXAMINATION OF CHILD—THE ANÆSTHETIC

It is useless to expect to make a satisfactory examination of these cases if they are lying on their mother's lap with all their clothes on. To examine a child properly it should be undressed or have all its clothes loosened and its napkin off. Place it on a blanket or rug on a couch or firm bed. The abdomen should then be palpated carefully with the fingers. If nothing can be made out in this way, it should be examined bi-manually, the fingers of one hand being placed in the loin just as in examining the kidney—first on one side, then on the other. The abdomen is often soft and flaccid, the tumour is not tender. It sometimes undergoes alteration in size and shape while being examined—at one time becoming so soft that it can scarcely be made out, at another becoming hard again. If there is any distension, or if the child resists or screams, it is quite hopeless to expect to find any mass in the abdomen, even though there may be a large one. Under these circumstances an anæsthetic must be given; indeed, it should always be given for diagnostic purposes, whenever you fail to feel a tumour, even though the child may not have seemed to resist your manipulation in any way. No one need hesitate about giving $CHCl_3$ for this purpose. If a second man is handy, and the financial circumstances of the people permit it, he should be sent for, but when people are without much means the doctor may give the anæsthetic alone. If he does not care to do this, he should send the child at once to the hospital as a suspected case of intussusception. These babies generally take $CHCl_3$ well, and in a very short time are sufficiently relaxed to permit satisfactory examination; then there is no difficulty in feeling a tumour if there is one.

Nearly all writers on this subject have described the tumour that is felt as a "sausage-shaped" mass. Occasionally it may resemble this article of food in size and shape, but more often it does not. The mass that is felt in the early cases is often more rounded than oblong and about the size of a walnut. It is sometimes a little difficult to feel when it happens, as is often the case, to be at the hepatic flexure of the colon, small, and tucked up under the liver. In the early cases the mass will generally be found on the right side or in the middle of the abdomen just above the umbilicus. In later cases it is more often found on the left side, in the descending colon or sigmoid; and we must not forget that sometimes (but this is very rare), when we fail to feel it in the abdomen, it may be discovered by the finger in the rectum. In searching for it we should go systematically through the abdomen, beginning at the cæcum, follow the colon right round. When there is great difficulty in making out the position of the mass, it can be located by a bi-manual examination, one finger being in the rectum. When the mass is in the T-colon it is sometimes very low in the abdomen, and is easily moved about. If oblong, it is always curved with the concavity towards the umbilicus. When the tumour feels very hard, it is often an indication that there will be very considerable difficulty in completing the squeezing-out process when the mass is reached. As a mass is invariably present in cases of intussusception, it should be possible to make it out if we examine carefully. I can only remember two cases in which I opened the abdomen without first feeling the mass. In these cases there was much distension, but the history and the symptoms were characteristic. I felt certain, too, that if I did not meet an intussusception I should find some other form of intestinal obstruction.

When the mass is once felt the diagnosis is complete. The important point to settle then is where and how the child is to be treated. The parents must be told of the seriousness and urgency of the conditions. If it is a case for a public hospital, the child should be sent at once with a note to the Medical Superintendent, marked "Urgent," so that there will be no delay about the admission. In the case of well-to-do people, it is far better to get the child and its mother sent to a private hospital, or surgical home, than to attempt the operation in the patient's house. An intussusception can be operated on in a private house, but there is a better chance of recovery when the operation takes place in a properly equipped operating-room.

### THE ANÆSTHETIC

The majority of my cases have been given $CHCl_3$, a few chloroform and ether, and fewer still ether alone, on the open mask. I notice that young anæsthetists are nearly always nervous when giving an anæsthetic to a baby with intussusception. It is very important that the anæsthetic should be properly administered. Some men are over-anxious, some are too bold—both are equally dangerous as anæsthetists at any time, but especially when one has to open a baby's abdomen. The over-anxious man has the child "light" all the time. It moves when you make the first cut; then after an interval it is put under sufficiently to allow you to get to the peritoneum, but just as this is being opened, at a most inopportune moment, it strains, and the omentum with some coils of intestine rush out. This untoward accident very much increases the risks of the operation. Until the child is got under again, it is almost impossible to return the intestines through the small opening that has been made, or to make this larger. There is nothing to be done but to place the sponge over the bowel to prevent more coming out, and to wait. Meanwhile the intestine may be getting damaged and the child is feeling the shock.

I know that several deaths, in my series of cases, were due largely to the maladministration of the anæsthetic.

Two cases died of chloroform-poisoning before the operation was commenced—they are noted in the statistics in the Appendix.

As house surgeons are constantly coming and going, one seldom gets the same man to give an anæsthetic for an intussusception more than two or three times. So, more often than not, when operating for intussusception, it is your anæsthetiser's first case of its kind. The operator, under such circumstances, should reassure him and explain to him the dangers of having the child too lightly under the anæsthetic. Nearly all babies get a large amount of shock directly the peritoneum is opened. They become pale and almost pulseless, and the breathing is very shallow. This condition naturally frightens most men, and they discontinue the anæsthetic (now is the time for strychnine, which must always be handy). But the anæsthetic must not be discontinued. To do this only increases the shock; and the child will soon vomit, and thus complicate matters very considerably.

Opinions are divided as to which is the best anæsthetic. In the Appendix (A) will be found the views kindly supplied me by Dr. Binney and Dr. Wade on this subject, from different points of view. One favours chloroform, the other ether. Both opinions are entitled to respect, since these gentlemen have had a very large experience in the administration of anæsthetics.

# CHAPTER V

## TREATMENT—IRRIGATION

When an intussusception has been diagnosed, there are only two methods of dealing with it—(1) Irrigation; (2) Laparotomy. In many quarters, even as late as fifteen years ago, Irrigation was practically the only treatment considered justifiable. Injections were repeated again and again; Laparotomy was only performed as a last resource, when, of course, the case was nearly hopeless.

The treatment by irrigation has its limits. It can only succeed in effecting a complete reduction in a certain percentage of cases. Personally, I have been successful only in 14 out of 138 cases in which I have tried it—10·8 per cent.

It is because so many men have failed to appreciate its limitations that this method of treatment has fallen into disrepute.

Mr. E. Owen,[1] in his address on "What is Intussusception, and How should it be dealt with?" evidently feeling very strongly on this matter, says: "I deem it nothing less than a calamity that physicians have, every now and then, managed to chase back an intussuscepted piece of bowel by using an enema."

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[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

Clearly, Mr. Owen thinks it hopeless to attempt to teach men to use irrigation with discretion. Seeing that many lives have been lost by expecting too much from the treatment, he evidently considers it best done away with altogether.

Mr. Pitts[1] still uses irrigation in early cases. In opening the discussion on Intussusception at the Annual Meeting of the British Medical Association in 1901, he said: "The most unsatisfactory feature in attempts at inflation is that you are never sure that you have succeeded in reducing the whole of the intussusception, and in the ileo-colic and enteric forms it is most improbable that success will attend your efforts. It is not so very uncommon to have an intussusception of small bowel into small near the cæcum, and then a further intussusception into the cæcum. Again, in operating on intussusception, one cannot but be struck by the considerable difficulty experienced in the majority of cases in effecting a complete reduction, even when the part is manipulated outside the abdomen. . . . It is, then, this uncertainty as to the exact condition of the bowel which makes the surgeon prefer to handle and see the bowel. The length of time which has elapsed since the first onset of symptoms cannot altogether be relied upon as a guide; such swelling may take place in a few hours so as to induce gangrene, or make the reduction by abdominal section and taxis extremely difficult; whilst intussusceptions which have lasted for days, or even two or three weeks, are occasionally reduced with comparative ease and with very little change visible in the bowel after its reduction. What happens in intussusceptions is very much the same in this respect as in strangulated hernia, except that in the intussusception of children swollen mesenteric glands are constantly met with, and often form one of the great difficulties in the final reduction. I would, then, reserve trial by inflation to cases seen within a few hours of the commencement of symptoms, and then only when the symptoms are not of a very acute form. It follows that most cases seen in hospital are best dealt with at once by operation. In some cases, however, when the intussusception has travelled along the transverse or descending colon, inflation may be employed as a useful preliminary to exploration, and will often limit the field of operation and enable the incision to be made directly over the swelling. Even if complete reduction should apparently take place, it will generally be best to make sure by a small incision; otherwise there must remain a considerable doubt, and it is highly probable that reduction is not quite complete, and will recur, or else will give rise later to a condition of chronic stenosis."

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[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

Mr. D'Arcy Power,[1] at the same discussion, said that although he was formerly an advocate for irrigation of the bowel, greater experience had taught him that this method was not to be relied upon. He now performed abdominal section at the earliest possible opportunity, reducing the intussusception if possible without bringing the tumour into the wound, though he has no hesitation in making a very large incision and bringing the intussusception outside the abdominal cavity if there were the least difficulty in reduction.

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[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

Mr. Eccles,[1] at the same Meeting, advocated "Immediate Laparotomy."

Mr. Tubby[1] was of opinion that in all but possibly the earliest cases (that is, those of a very few hours' duration) the patient stood a much better chance if abdominal section was performed at once.

Mr. F. C. Abbott[1] had only seen one case cured by inflation, and was strongly convinced of the advisability of immediate operation, if circumstances were favourable. When the abdomen was distended, it was advisable, at the beginning of the operation, to inflate in order to reduce the length of the intussusception. Although the earlier portion was easily reduced with the finger, still the distended small intestines were liable to escape and so lengthen the operation.

Mr. J. Paul Bush[1] was glad to hear the strong remarks made concerning the importance of early abdominal section in these cases. He thought the time was not far distant when inflation and such-like methods of reducing the intestine would not be tried and so much valuable time in that way lost.

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[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

Mr. Eve,[1] the President of the Section, maintained that injection (or inflation) was very rarely efficacious, was not infrequently followed by an illusory or partial reduction, and was haphazard and therefore unscientific.

With these opinions nearly all the others who took part in this discussion agreed, except Dr. Sinclair White,[1] who thought "irrigation should not be entirely discarded."

The arguments used at this discussion are, without doubt, calculated to appeal to all surgeons who have had any experience of these cases, because it is an absolute fact that complete reduction can be effected by irrigation only in a small percentage of cases. Again, it is always impossible for a few hours, in any given case, to say whether or not complete reduction has taken place after irrigation.

On the other hand, we cannot get away from the fact that some men have been very successful in their treatment by irrigation. Dr. Jeffreys Turner,[2] of Brisbane, in a paper on "Practical Observations on the Management of the Diseases of Infancy," says: "There is a tendency at present towards subjecting all cases of intussusception to cœliotomy. With this I am not altogether in agreement.

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[1] *Brit. Med. Journ.*, London, 1901, Sept. 7.

[2] *Austral. Med. Gaz.*, Melbourne, 1905, August.

Perhaps my experience has been exceptionally fortunate. Out of my last eight or nine cases, reduction by hydrostatic pressure was tried in all but one; in one it failed. All the remainder made perfect recoveries without further treatment. But to get good results you must observe the following conditions:—Firstly, the infant must be thoroughly anæsthetised; secondly, you must, if necessary, use a high degree of pressure—the risk of rupturing the bowel is small, and you must take it; thirdly, the reduction by injection must be attempted once and for all—never repeat it. If it fails, cœliotomy is the only course. Whether you use a short nozzle or a catheter introduced for several inches matters little. A conical plug or soft rag and firm manual pressure on buttocks are necessary. I think a long enema is as good as a douche can and long tube. At first I used to be afraid of using too great pressure, but it is difficult to keep up pressure enough, owing to the escape of fluid from the anus."

In the face of this very strong evidence, and taking into consideration the record of successful cases that we find recorded in the Medical Journals, are we justified in saying that this form of treatment should be entirely abolished?

Mr. Jonathan Hutchinson[1] has expressed his opinion on the subject with great clearness. In his "Notes on the Operative Treatment of the Intussusception of the Bowels," he says: "It is absurd to institute any comparison between the treatment by insufflation or injection and that by laparotomy. The rule of practice ought to be invariably to try the former measures in the early stages. It is only when they have failed that laparotomy ought to be thought of. The two measures are not competitive, but one is supplementary to the other. Statistical tables instituting a contrast as regards the relative success of the two measures are mere waste of labour."

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[1] *Arch. Surg.*, London, vol. iv.

These are weighty words, and it is a pity that they are not more widely known.

I have consistently, ever since I first wrote on this subject, advocated a preliminary irrigation. In a paper written in 1897, which appeared in the *British Medical Journal*, I said: "I think injections of warm oil should be given in all cases, after the child is under the anæsthetic, even in cases of long standing when we know that it is impossible to complete the reduction by these means. My reasons are these. It always reduces the intussusception to a certain extent, and in the best and gentlest possible way; in this way it lessens the shock of the coming operation, because less manipulation of the intestines is needed. It is especially useful in cases in which we find the intussusception in the rectum; because if we do not use it we may find some difficulty in getting our fingers below the tumour to begin the squeezing process."

I have used injections in all my cases before operation; in the early ones with the hope of possibly effecting a complete reduction, in the later cases to reduce it as far as possible by this method in order to lessen subsequent manipulation.

I quite agree that it would be better not to give injections in hospital cases with the idea of effecting complete reduction, unless the surgeon is prepared to see the case again in six hours or so, should it be necessary.

This is what often happens. The injection has been given by the surgeon; the reduction has apparently taken place; the child is sent into the ward. A complete reduction has *not* taken place; the bowel soon travels down again, and the symptoms recur. The surgeon perhaps does not see the case till his visit next day; by then twenty-four hours have been wasted, and when the child is operated upon its chances of recovery are materially lessened. Probably the child dies: the surgeon anathematises irrigation, and says he will never use it again. Such instances —and they are not a few—cause this mode of treatment to be so much condemned. But it is not the treatment that needs condemnation: is it not rather slackness on the part of the surgeon, who has probably been far too sanguine of success from this treatment? The surgeon should never feel certain of having reduced an intussusception by irrigation, and should always be prepared to see the child again in a few hours. If this is not possible, he should operate at once.

I have to confess irrigation probably lost me one case; this was twelve years ago, at a time when I had had very little experience of intussusceptions. (See Case 2 in Appendix B.)

This case made me very careful. Nowadays, if there is the slightest thickening to be felt after the irrigation has been given, I always operate. On two or three occasions I have found, on opening the abdomen, that the intussusception has been completely reduced. Out of 138 cases I have only sent 16 back to the ward without opening the abdomen. In 13 of them reduction must have been complete, for there were only 3 recurrences.

I never use an injection unless I am prepared to go right on with the operation, and I am always agreeably surprised if reduction seems to have taken place.

*How Irrigation should be performed.*—The child should be anæsthetised lying on a warm water-bag on the operating-table.

For the injection I have generally used warm olive oil; but normal saline (T. 100) will do, given with an ordinary Higginson's syringe. There is no necessity to invert the child, though the buttocks may be slightly raised. In most children, after about 15 ounces have been injected, the fluid begins to come back. If the tumour can still be felt, the operation may at once be proceeded with. If, on the other hand, the tumour can no longer be made out, even after careful search, we may well hold our hands; but the child should be carefully watched, and on any return of the symptoms should be re-examined, in from six to eight hours. In any case it should be kept under observation in hospital for two or three days, and when discharged the parents should be told to bring it back at once if it is not well.

But I find injections are useful in all cases, even in those we do not expect to reduce completely. It is especially useful in cases where we find the mass on the left side of the abdomen. In a large number of cases the intussusception is very much reduced, and in the gentlest manner, by the injection. It is often pushed right round the colon; thus a mass that prior to the injection was felt in the descending colon will sometimes be found to have been pushed right round into the ascending colon. Now the point is this. Is there not far less risk from the operation when the mass we have to deal with lies in the neighbourhood of the cæcum, than when it is in the lower colon or rectum? Some men tell us it is quite easy, when the abdomen has been opened, to reduce the mass intra-abdominally with their fingers from sigmoid to cæcum. I have never yet met with a case in which it could be done easily and quickly; and I am quite certain that the manipulations necessary to bring about such a reduction intra-abdominally would cause far more shock and do much more damage to the intestines than an injection. But few men attempt this method of reducing an intussusception. When the abdomen is opened the mass is felt for. If it happens to be in the rectum, the fingers must be put into the pelvis to get below it in order to push it up into the sigmoid, when it can be brought outside. When once outside, the reduction goes on famously until the splenic flexure of the colon is reached, when it is nearly always necessary to replace the mass in the abdominal cavity before it will move any further. After more or less manipulation it is coaxed through the splenic flexure into the transverse colon. It is then easily brought into view again, and moves along readily until it comes to the hepatic flexure, where there is often another stop, the mass having again to be placed in the abdomen before it will go on. After it passes this obstruction, and gets into the ascending colon, it must again be brought outside in order that the final unfolding may be observed. The amount of shock that is caused by all this manipulation of the colon, this pulling out and pushing in, and the damage that may be done to the small intestines (which often obtrude themselves) will be apparent to all who have done any abdominal surgery. Now, in a good many cases, by using an injection before opening the abdomen all this manipulation will be avoided. The mass which has been pushed round from the left to the right side of the abdomen can be easily reduced by an incision just outside or through the right rectus. There is no prolapse of the small intestines, and the handling of the bowel is reduced to a minimum. And yet we are told that to give an injection to a case of over twenty-four hours' standing is unscientific, useless, and dangerous! The danger must be very remote, because I have used injections in nearly every case I have operated upon before opening the abdomen, and I have not yet met with a ruptured colon. I feel sure that when men use injections intelligently, and recognise what can, and what cannot, be accomplished by them, they will find that they are still of great value as an aid to treatment in intussusception.

# CHAPTER VI

## THE OPERATION

WHEN an intussusception has once been diagnosed, it is important that the operation should be performed as soon as arrangements can be properly made. It need not be rushed at the cost of imperfect arrangements, but there should be no unnecessary delay.

It is, of course, useless and harmful to continue to feed the child. If it is left in the mother's care, while arrangements for the operation are being made, she should be warned not to give it the breast. If there must be great delay it should be given nothing but small quantities of warm water.

*The Operation.*—When the child is placed on the table on the hot-water bag, take care that the bag is properly covered and hot—but not too hot; babies are easily burned. The surgeon should always administer the injection himself. He is responsible. He has to take into consideration the size of the child and the position of the tumour, and has to consider how much fluid to inject and how much force may be used. After injecting about 15 ounces the fluid generally begins to return. If it is decided not to use any more force, the fluid may now be allowed to escape (this is much facilitated by detaching the nozzle of the syringe and leaving it in the anus), and while this is going on the abdomen may be palpated. If the mass has entirely disappeared, I do not proceed, but send the child to bed, first giving it a small dose of morphia hypodermically. But, of course, in the great majority of cases the mass has not disappeared, but can still be felt, though in an altered position. Then the operation should be proceeded with; the child's abdomen getting a final clean-up while the surgeon is re-washing his hands.

*Incision.*—The site of the incision depends largely upon the position of the mass in the abdomen. When it is on the right side and so, presumably, in the region of the cæcum, the incision can be made outside the rectus or through the outer border. But if the mass, from its position in the abdomen, is likely to be found in the descending or transverse colon, then the mesial incision must be used. The advantages of the lateral incision, in a suitable case, are that the mass can be readily got at, often without the prolapse of any coils of small intestines. This is obviously a very distinct advantage. The disadvantages of this incision are several. The abdomen is not so easily opened; there is more bleeding; several nerves may be cut; the abdomen is not so easily closed. A hernia much more frequently follows a lateral incision than one in the middle line. So, when we make this incision, we have to consider whether the advantage from the lessening of the immediate shock counterbalances these drawbacks. When the incision is made in the middle line it does not go through, but passes on one or other side of, the umbilicus, and should be made from 1½ to 2 inches above and extend to 1½ to 2 inches below this point. It is far better to have too large than too small an incision. In some babies a large amount of fat will be found on the abdominal wall, and such a deposit of fat necessitates an extra long incision. All the bleeding should be stopped, and the forceps removed, before the peritoneum is opened. Fine mosquito forceps should be used to pick up the vessels, which should be tied off with very fine catgut. It is important that the child be well under the anæsthetic before the peritoneum is opened. The opening of the peritoneum has always a depressing influence. The child becomes pale, but I think the shock is less if it is well under it, instead of being, in anæsthetic parlance, "light." Directly the peritoneum is well opened the tumour should be felt for with two fingers. If it is near the cæcum it may be delivered at once, and when outside the abdomen it is reduced by gently pushing and squeezing the mass through the enveloping bowel, upwards from below. Sometimes a considerable amount of pressure has to be exerted before the very last portion unfolds itself. If the mass is in the descending or transverse colon, some men endeavour to reduce it to the ascending colon intra-abdominally before delivery. Only very occasionally have I found this possible.

*Prolapse of the Intestines.*—If possible, the coils of the small intestines should be kept in the abdomen, but it is quite useless to waste time fighting with them. Your object is to get at the mass as quickly as possible, in order to reduce it and to close the abdomen. And ten minutes or so wasted in fruitless efforts to retain these coils is calculated to do more damage and cause more shock in the end than the plan of allowing them to prolapse at once, when there is any difficulty in retaining them while you are searching for the tumour.

When the intestines have prolapsed, there is of course no difficulty in finding the tumour. It should be delivered, and if it can be reduced easily this should be done before replacing the intestines. The part of the bowel that has been nipped may well have some hot normal saline poured over it.

To replace the intestines it is necessary to hook up firmly each side of the abdominal wound, and as the intestines are being returned, it is a good thing to have hot saline gently poured over them all the time, by an assistant. When once the intestines are in, cover them with a flat case of sea-sponge.

If the intussusception cannot be easily reduced, and when it is evident that there is going to be some trouble in reducing the last part of it, any intestines that may have prolapsed should be returned and covered up with a sponge before prolonged efforts are made to complete the reduction.

The reduction of an intussusception is always accomplished by squeezing from below upward, *not* by pulling on the entering bowel. The first part of the reduction nearly always proceeds rapidly, the only obstacles being the colon bends, where the mesentery is short. In the bad cases the difficulty begins when the mass has been pushed into the ascending colon and gets to the cæcum; there it often stops and will not budge. You are putting on as much pressure as you dare, the serous coat of the intussuscipiens is tightly stretched, and you think the bowel must rupture if you press any harder. Indeed, you may often see and feel the serous coat crack and tear under your fingers. You have now arrived at a very critical moment. You may get your assistant to very gently pull upon the entering bowel while you continue to squeeze and manipulate the mass, at the same time doing your best to protect the sheath from further stretching. If there is no result from these efforts—not the slightest yielding—the time has come when you must decide how much longer to continue in this way, or whether to desist. No one gives up the attempt to reduce willingly, because the alternative, resection, is fraught with so much immediate danger, and offers so slender a hope of success. When considering this subject, it is well to bear in mind that very prolonged attempts at reduction by manipulation produce such intense shock that the child may be quite unable to rally, should it be found necessary to resect. Happily, these very tightly fixed cases are not now often met with. The mass, after resisting pressure for some time, begins to yield and gradually unfolds itself. I have never seen any real adhesions; the main obstacle to reduction is the œdema of the intussusceptum.

If the intussusception started at the caput cæci, or (in the case of a double one) perhaps a few inches up the ileum, it will be noticed when the whole mass is apparently reduced that there is a small, hard, cup-shaped depression at its starting-point. This concavity, which will be at the caput cæci (or, when it starts in the small bowel, at the side opposite the mesentery), must be gently pressed out and made convex. After this has been moulded into proper shape it must be held in this position for a minute or so, because it often tends to become cup-shaped again when the pressure is taken off. The appendix is nearly always maroon-coloured, from the nipping it gets, but unless it is black or has lost its polish I leave it alone. Our main object in these cases should be to get the abdomen closed as soon as possible; anything that delays this must add to the shock, and so lessen the chance of recovery.

After the reduction is complete, any tears of the serous coat may be drawn together by a few fine catgut sutures. The damaged bowel should then be carefully washed and returned to the abdomen.

*Resection.*—Gangrene of the gut as a result of intussusception is luckily rare. When it does occur, and when, from any reason, it is not possible to reduce the intussusception, or when, after reducing the intussusception, the intussusceptum or the intussuscipiens are found so much damaged that they cannot safely be returned, then we have to make up our minds quickly how to deal with this complication.

I think it is best met by a complete resection of the parts involved and an end-to-end anastomosis. Personally, I dislike the idea of an artificial anus.

Mr. A. E. Barker devised an ingenious operation for resecting the bowel in cases of intussusception. The following is his description :—"At the point at which the intussuscipiens receives the intussusceptum the two portions of the bowel are at once united by a continuous circular suture of fine silk, taking up the serous and muscular coats of each and carried on to the mesentery. A longitudinal incision is then made for about 2 inches through all the coats of the intussuscipiens on its free margin. This gives access to the sausage-like intussusceptum within. The latter is then drawn out through this incision, and is cut across close to its upper end, or if too long to be first drawn out, it may be cut across *in situ*. A few stout silk sutures are, however, passed through all the walls of the stump, as the mass is gradually cut off, and are tied tightly so as to keep the serous surfaces in contact, and control all bleeding from the vessels entering it at its mesenteric attachment. The stump is now cleansed, dried, and dusted with iodoform, and is allowed to drop back through the incision into the lumen of the intussuscipiens. Then the longitudinal incision in the latter is closed by a continuous suture from end to end. Toilet of the surrounding parts and closure of the abdominal wound complete the operation, which in my first case only lasted half-an-hour, and in my second a little longer. In a future case I shall look forward to finishing the whole operation in a much shorter time and with much less manipulation. Now, in this operation, the resulting junction of the bowel is just what we aim at in the far more elaborate procedure of direct resection of the bowel. But we have the great advantage, besides the saving of time, of not interfering with possible adhesions at the point of strangulation or with the mesentery. Moreover, the vessels of the latter are probably blocked by the strangulation at a point above that at which they are cut, and if they are not so, they are closed by the same sutures which bring together the divided edges of the stump."

I have found it necessary to resect eight times, but not lately. Only one recovered. (Case 14, Appendix B.) In this child the intussusception was not irreducible nor gangrenous, but the bowel was so much torn in so many places that it could not be mended.

The mortality from resection for intussusception in children will always be very high. It prolongs the operation, and adds materially to the great shock these cases always suffer from, and very few cases live more than a few hours after the operation is completed.

Fortunately the necessity for resection is not nearly so frequent now as in former years, because cases are brought to us much earlier.

*Closure of Abdomen.*—For many years I have abandoned any form of drainage in ordinary cases. I find that the safest and most expeditious method of closing the abdomen is to use a Reverdin's needle and put in through-and-through silkworm-gut sutures.

If the case has been a simple one, easily reduced, if there has been no trouble with prolapsed intestines, if the child is not suffering greatly from shock, and, therefore, there is no great need for haste, then I sew up in layers, using catgut, especially if the opening has been to the right of rectus instead of in the middle line. But if you do thus sew up in layers, you must not rely on catgut alone; you must also put in a couple of "silkworms," taking the skin and aponeurosis. I have twice seen catgut give way and the intestines prolapse to the skin, through the neglect of this precaution.

The "silkworms," when used alone, often cut and cause skin irritation, but they must not be taken out too soon. You should never allow all the sutures to be removed before the tenth day, and it is better, if possible, to leave some for a fortnight. If they are cutting badly, every other one may be removed at the end of a week, but to take them all out at that date is to cause disaster. Many accidents have happened through the premature removal of sutures by over-confident house surgeons. In three of my cases the wound opened up and the intestines prolapsed into the bed from this cause.

*Dressing the Wound.*—To dress these cases properly, a little care and common-sense is needed. Do *not* just put on gauze, and then narrow strips of wool, one on the top of the other, in the middle of the abdomen, and attempt to keep this dressing in place by means of a many-tailed bandage many times too large for the infant. If you do, you must not be surprised in a very short time to find the dressing on the child's back instead of on its abdomen. The gauze should be damped to prevent it from slipping; two flat pads of wool should be placed on it, and a layer of wool should go right round, so as to cover the child's back and sides as well as the abdomen. This should be kept in place by means of an ordinary roller bandage, snugly, but not too tightly, applied. To apply this bandage the child should be held up by two nurses, one holding the head and shoulders, the other the legs and thighs.

# CHAPTER VII

## AFTER-TREATMENT

THE immediate after-treatment is important, because it consists in taking measures to combat the profound shock from which these little ones often suffer. Strychnine will probably have been administered hypodermically during the operation, if it has been a bad case; this can be repeated as soon as the child is in its cot. The child should be placed on a hot-water bag, or have one on each side of it. A saline under the skin during the operation, or in the rectum afterwards, is sometimes indicated, and may be of much service. I always order a small dose of morphia ($\frac{1}{50}$th grain) to be given hypodermically directly the child begins to be restless. In most cases this is necessary as soon as the effect of the anæsthetic begins to wear off—the dose varies with the age and size of the child. This small dose of morphia lessens the shock, gives them rest, and keeps them quiet. I have never seen any ill-effects.

As soon as they can swallow, they may have small quantities of albumen-water by mouth, and from time to time, as they require it, small doses of brandy (15 to 20 drops), which may be given in small quantities of the albumen-water.

Formerly I used to feed all these children artificially for forty-eight hours, whether they were being breast-fed or not. At the end of that time, if they seemed to be doing well, those that were at the breast were allowed to return to their natural nourishment. Now I let all those who are at the breast have it again as soon as they are able to suck. It is undoubtedly the best way of feeding them and saves no end of trouble. After the first day the mother may take the child out of its cot to suckle it. It is unnatural for a baby to lie absolutely still on its back all day, and this act of suckling, which necessitates the child being moved first on one side and then on the other, is no doubt beneficial to it.

It is extremely rare to have any difficulty with the bowels after these operations in children. At the end of twelve hours the child has an enema of weak permanganate of potash, which generally has the effect of bringing away flatus, some altered blood, and some fæces. If there is any distension, the enema is repeated, and if the result is not satisfactory, a small dose of calomel may be given. The first few motions after an intussusception has been reduced frequently contain altered blood mixed with fæces. Sometimes there is a tendency to diarrhœa, which has to be treated with small doses of castor oil, or small doses of calomel and irrigations of weak Condy's fluid.

In children's hospitals it is most important, if possible, to prevent these cases getting infected with gastro-enteritis from children suffering from that complaint who may happen to be in the hospital. If gastro-enteritis cases are admitted into the hospital, they should be kept well away from the surgical ward. I have lost two or three cases from this cause.

In nearly every case, after the operation the temperature is raised, often to 102 or 103, and the pulse is always quick—160 to 180. If all is going well this gradually subsides, the pulse-rate and temperature drop, and reach the normal in three or four days.

*Recurrences.*—A recurrence, following a supposed complete reduction by injection or inflation, does occur and must always be expected. But a recurrent invagination coming immediately, or soon after, reduction has been effected by laparotomy is very rare. It did not occur quickly in any of my cases. In my series I find I have operated on two children twice for recurrent intussusception coming on two and six months after the first operation. (See Cases 26 and 27, 69 and 73 in the Appendix.)

Some men, with the idea of preventing a recurrence, advise that the cæcum should be fastened to the peritoneum on the right iliac fossa just before closing the abdomen.

I have not thought it necessary to do this in any of my cases, because I have always looked upon it as meddlesome surgery. It would be almost an impossibility when the incision is in the middle line.

With the lateral incision it could easily be done. It must prolong the operation, although only very slightly, but in these cases every minute counts.

# APPENDIX A

(*See p.* 29)

Dr. Binney says: “In administering anæsthetics to young infants on whom it is intended to perform laparotomy for the reduction of an intussusception, it is necessary to produce the following effects:—(1) Absence of coughing and retching; (2) General muscular relaxation; (3) Diminished peritoneal reflex. To secure the foregoing an unirritating anæsthetic must be chosen, and, in my opinion, chloroform should be given and continued during the manipulations. It is necessary to give it freely, with a liberal supply of air, and continue its administration until the stage of surgical anæsthesia is well established. If any untoward symptoms should arise attributable to the anæsthetic alone, then the stimulating effect of ether may be called into aid. After the main steps of the operation are over, and the wound in the abdomen is being closed, the substitution of ether may be an advantage in helping the little patient to rally from the shock of the intra-abdominal interference. It must be remembered that in such a serious and critical operation the anæsthetist must think mostly of the operator’s reputation, and not at all of his own as an anæsthetist. The circumstances are those of life and death, and the result depends, to a great extent, on rapid operation, short exposure of intestines with their peritoneal surface, and as little manipulation as possible. I have seen a patient kept on the table an unnecessarily long time before the incision could be made, owing to the over-caution of the anæsthetist, who was anxious for the child to take ether so as to enable it better to stand the shock. The result was coughing and retching, actually resulting in incomplete anæsthesia, in which condition the operation had to be proceeded with; and this condition of coughing and retching continued after the opening was made, causing the intestines to be protruded, rendering reduction difficult, and resulting in a far greater amount of shock than could ever be caused by any anæsthetic. I am a strong advocate of ether, but must condemn it in these special cases; my advice is, use chloroform! It is admittedly a dangerous drug, but more dangerous here in small than large doses. It is better to chance an occasional over-dose and help the operation all we can, than to keep on the safe side with ether or light chloroform anæsthetic and at the same time seriously hamper the operator, and in turn much lessen the patient's chance of recovery."

DR. WADE says: "In cases of intussusception it is of the utmost importance that the anæsthetist should be a skilled administrator. I have seen at least three cases of intussusception where such shock arose on the surgeon handling the intestine at a time when the anæsthetist had not provided a sufficient degree of anæsthesia that the child died soon after the operation was concluded, never rallying from the shock, and it was undoubtedly due to the faulty manner in which the anæsthetic was administered that death resulted.

A deep degree of anæsthesia must be obtained, otherwise it will be found that, when the intestine is handled and the mesentery pulled upon in delivering the intussusception from the wound, reflex glottic spasm and circulatory failure (inducing a profound and frequently irremediable shock) will result; should the narcosis not be sufficient to relax the recti abdominis muscles they will cause a large amount of gut to prolapse from the wound, entailing much handling of the bowel when replacing it, with consequent shock.

As to the choice of the anæsthetic, chloroform or ether, the latter is to be preferred; it is a cardiac stimulant and with it the reflex cardiac response is lost at a lighter stage of anæsthesia than is the case with chloroform; for instance, with ether, with a small pupil actively reacting to light and the corneal reflex not quite lost, the intestines may be handled without any fear of laryngeal spasm or cardiac syncope—effects which would inevitably occur with the same degree of anæsthesia, if chloroform were the agent employed. In children the eye reflexes form a more reliable guide as to the depth of anæsthesia with ether than do they with chloroform.

If the child be not over-saturated with ether—a common fault—the after-effects are but slight, but little vomiting and a quick return to consciousness, and the risk of renal and respiratory troubles practically nil.

Ether may be conveniently given on a Skinner's mask, drop by drop at first, until tolerance is established, then 20 to 30 drops at a time, keeping the lint well wetted with it until sufficient depth of anæsthesia is obtained, when it will be found that but very little of the drug will be required to maintain it.

The drawback to ether is that if it is poured too freely on the mask at first, or a proper air-way not maintained, the child will salivate and strain, causing the breathing to be laboured and the action of the abdominal muscles to be exaggerated, with the resulting difficulty of prolapse of the intestines when the abdomen is opened.

If ether is to be employed, it should be given alone throughout and not preceded by chloroform, since to do so is to give chloroform at the stage where most danger is to be expected from it, viz. during the second stage when the child is struggling; and further, the initial circulatory depression, caused by the chloroform, takes at least eight to ten minutes to wear off and be replaced by the full accelerated ether pulse."

# APPENDIX B

## EXAMPLES OF CASES CURED BY INJECTION ALONE

CASE 8.—E. G., aged 6 months. Admitted to the Children's Hospital, July 19, 1895.

*History.*—Thirty hours ago screamed and turned pale. Passed blood eight hours later. Vomited several times. Under chloroform a tumour felt on the right side of the abdomen. Warm olive oil was injected, and the mass disappeared. In a few hours the child passed three motions; no vomiting. Child was discharged the next day, as it was not weaned, but it was kept under observation for several days, and remained quite well.

CASE 11.—E. C., aged 5 months. Admitted to the Children's Hospital, July 30, 1896.

Began to scream two days ago, and soon vomited and passed a motion consisting chiefly of blood and slime. Under chloroform cylindrical tumour, extending boomerang-like, in region of hepatic flexure of colon. Warm olive oil was injected, and the tumour was reduced partly by the oil, partly by manipulation.

*July* 31.—The child seems quite well; has had several motions, no vomiting; discharged cured.

CASE 16.—V. R., aged 15 months. Admitted to the Children's Hospital, November 5, 1896.

Was taken ill suddenly seven hours ago, and seemed to be in a great deal of pain. In two hours it started vomiting, and two hours after that it passed blood. Under chloroform a tumour could be felt in the right hypochondrium. Warm olive oil enema was given and the mass disappeared.

*November* 6.—Has not vomited since the injection. Passed a good night and seems very well. Has had five motions. First four contained a little blood. Discharged cured.

Case 62.—W. A., aged 5 months. Admitted to the Children's Hospital at 10.30 p.m., 16.9.01.

About 4 o'clock this afternoon child seemed to suddenly become faint, white and collapsed, and started screaming. A little while after started retching and also passed blood.

Has continued retching and passing blood ever since. Has passed no motion or flatus since 4 p.m.

*On Examination.*—Mass can be felt in ascending and transverse colon. Baby very white. Pulse quick.

Under $CHCl_3$ injection of warm oil was given; the intussusception was reduced. The child made an uninterrupted recovery.

Case 97.—M. W., aged 9 months. Admitted 11.11.03.

Ill since 4 p.m. yesterday. Onset sudden, with evidence of abdominal pain, became pale and weak. At 5 p.m. passed motion mixed with blood and slime; vomited at 8.30 p.m. after breast, and again at 2 a.m. At 9 a.m. found blood and slime again.

*Previous History.*—No diarrhœa. Healthy child from birth.

*On Examination.*—General condition fairly good. Under anæsthetic mass felt in right upper aspect of abdomen. Oil injected, after which mass could not be felt.

12.11.03.—General condition good, no sign of recurring.

13.11.03.—Child quite well.

This case is an example of the danger of allowing twenty-four hours to elapse before re-examining:—

Case 2.—I. C., aged 4 months. Admitted to Children's Hospital, September 19, 1894.

Said to have been quite well till yesterday, when suddenly turned white, drew up its legs and screamed; afterwards attempted to vomit; passed blood and slime by bowels, and has been passing this frequently since; seems to be in less pain to-day.

A well-nourished, vigorous child; abdomen not distended; it is doubtful if there is pain on palpation; no tumour to be felt, and nothing by rectum.

At 4 P.M. had an anæsthetic; abdomen palpated without anything being felt; child inverted, and large enema given.

*Sept.* 20.—The child in same condition; laparotomy at 4 P.M.; cæcum found in colon, about three inches, reduced without difficulty; cæcum much congested. There was great difficulty in returning the small intestines, and the abdominal wound had to be enlarged.

The child died at 3 A.M. on the 21st, eleven hours after operation. T. 105 degrees just before death.

## EXAMPLES OF RECURRENCES AFTER LAPAROTOMY, THE INTERVAL IN ONE CASE BEING SIX MONTHS AND IN THE OTHER TWO.

CASE 26.—R. C., aged 2 years and 2 months. Admitted to the Children's Hospital, February 21, 1898, at 2 P.M.

At 7 P.M., February 20, he complained of pain in the abdomen, threw himself on the floor, and got white; since then he has passed blood and slime frequently from the bowel. At present general condition of the child is good. In right iliac and umbilical regions a fairly large hard mass can be felt. Per rectum, a mass not far from anus can be felt, and the lumen of the intussusceptum can be distinctly made out.

Under chloroform, after an injection of warm olive oil, which very much reduced the size of the mass, an incision was made in the middle line, beginning just above the umbilicus. The intussusception was delivered and reduced without much difficulty. It was colon only, beginning just below the cæcum; wound closed; gauze drain left in.

*February* 22, 1898.—Temperature, 102; pulse, 160. Not much pain; has passed mucus; no blood.

*February* 22, 1898.—Had small quantities of morphia hypodermically three times during the night. Temperature, 104, at 10 P.M. (when he was sponged); has passed a fair motion; more morphia, as he was still restless.

*February* 23, 1898.—A partly formed motion; took his food well and slept well.

*February* 27, 1898.—Has had diarrhœa on and off; fed on Benger's food one-third milk. He had a stitch abscess, but he ultimately made a good recovery and was discharged cured on March 20, 1898.

CASE 27.—R. C., aged 2 years and 8 months. Admitted to the Children's Hospital, September 20, 1898, at 2 P.M.

This child was discharged cured from the hospital after a laparotomy for intussusception six months ago. The father states that the child was taken suddenly ill that morning with the same symptoms he had on the previous occasion, therefore he thought it best to bring him straight to the hospital again.

On admission, the child does not look very ill; he has been vomiting and passing blood by the bowel. At 4 P.M., under chloroform, a large injection of warm olive oil was given, which seemed to completely reduce the large mass which had previously been felt in the region of the transverse and descending colon. The child was taken back to the ward. On examining the child a few hours later the tumour was found to have returned.

Under chloroform the abdomen was opened in the middle line. The intussusception, which was colon into colon, was easily reduced. A small gauze drain was inserted and the abdomen closed in the usual way.

*September* 21.—Drain removed; pulse, 140; temperature, 103; respiration, 46. Passed a natural motion. The child after this made a quick recovery, and was discharged cured in three weeks from the time of admission.

Case 69.—A. S., aged 5 months. Admitted to the Children's Hospital, March 22, 1902.

Started vomiting yesterday afternoon and this has continued.

About 9 o'clock last night had a screaming fit. Very restless all night, screaming at intervals. Early this morning child passed a normal motion and soon afterwards passed bright blood, wetting napkin through.

*On Examination.*—Child collapsed. T. 98·8; P. 148; R. 36. Abdomen soft, easily palpable.

In left iliac region is to be felt sausage-shaped tumour.

Intussusception can be palpated P.R.

10 A.M.—Under chloroform, abdomen opened over appendix by a vertical incision passing through the rectus—after an injection had reduced the greater part of the intussusception.

Intussusception found ileocæcal; reduced bowel somewhat nipped, was healthy.

Abdomen sutured with silkworm-gut.

Had liq. strychnine 1 minim hypodermically before operation.

Grain $\frac{1}{60}$, then almost immediately further grain $\frac{1}{120}$ morphia. Slightly restless. Not distended.

23.3.02.—Very well; had grain $\frac{1}{60}$ morphia again last night. Had injection with good result, and has had two motions since—naturally.

No vomiting since operation. Discharged cured.

Case 73.—A. S., aged 7 months. Admitted to the Children's Hospital, 15.5.02.

About three hours ago child fidgety. Began to scream. Went to sleep about $\frac{1}{4}$ hour. More screaming and straining.

Vomited about ½ hour from first scream; vomited a little since.

Straining to pass motion, but bowels not open. No blood.

*Previous History.*—Operated on for intussusception two months ago.

*On Examination—Under Chloroform.*—Tumour in position of ascending and transverse colon. *Under Chloroform and Ether.*—Mass partly reduced by olive-oil injection. The old scar (to right of middle line) made the seat of incision. Many adhesions in neighbourhood.

The intussusception brought into wound and reduced (of the ileocæcal variety). The appendix long. A number of adhesions separated between small intestine and parietal wall round edges of wound.

Wound united with through-and-through fishgut sutures.

A good deal shocked. Pulse almost stopped at one period of operation, but recovered greatly later on.

16.5.02.—Very well. Temperature still up a little, 99; P. 128. Bowels moved through night, contained a little blood.

17.5.02.—Temperature up to 101 yesterday, but down again this morning. Seems very well. Pulse good. B. normal.

18.5.02.—Still doing well. Fed by the mother to-day.

21.5.02.—Doing well. Motions rather relaxed and numerous last two days; inclined to be green, not foul-smelling. Discharged cured.

## RETROGRADE INTUSSUSCEPTIONS

CASE 116.—C. P., aged 9 months. Admitted 11.11.04.

Child ill since 12 o'clock to-day. Began with a fit of screaming, then vomited. Four hours later bowels opened slightly; motion and blood. Later still, child passed a quantity of blood and slime.

*On Examination.*—Child pale, pulse rapid; abdominal walls lax; large tumour to be found above and to the left of umbilicus.

*Under Ether.*—Oil injected, tumour reduced to right iliac fossa. Abdomen opened in middle line, intussusception (ileocæcal variety) found to be very tight. During reduction peritoneum torn in several places. In the small intestine there were three or four small intussusceptions, retrograde, each about 1½ inch of gut; these were reduced easily. The wound was then closed with silkworm-gut and horsehair.

The next day, 13.11.04, child very well. No vomiting. Pulse good; temperature normal.

After a slight attack of diarrhœa this child made a rapid recovery.

CASE 124.—W. J., aged 4 months. Admitted 1.5.05.

Ill since 29.4.05. Began to cry a great deal and was restless all night. Last night she screamed a lot; bowels naturally opened till 6 this morning. Bowels opened at 8 A.M.; motions green with white lumps—foul. Vomited a large quantity this morning. At 10 A.M. passed blood with motion, blood quite red.

*Under C. and E.* large mass felt in the left iliac fossa. An attempt was made to reduce with oil without result. Mass delivered and reduced. The intussusception was of the ileocæcal variety, but the mass after reaching the descending colon appeared to form a retrograde movement *en masse* and to be invaginated into the colon higher up the bowel. So, in reduction, pressure first in one direction, then in the opposite was necessary. Wound closed with through-and-through silkworm-gut sutures.

2.5.05.—Child restless all night; pulse good; temperature, 99. Abdomen somewhat distended, bowels opened with injection, passed flatus, motions green, curdy, and foul.

3.5.05.—Child very well. Motions natural. Takes food well. After this the child made a rapid recovery.

## EXAMPLE OF INTUSSUSCEPTION OCCURRING DURING AN ATTACK OF DIARRHŒA

CASE 117.—A. B., aged 8 months. Admitted 30.11.04. Child has had vomiting and diarrhœa for about three weeks, motions green and slimy. Had bowels opened three times yesterday, last time about 4 P.M. Has been much worse during the last twenty-four hours. Passed blood (no motion) at 8 A.M. to-day.

*On Examination.*—Child very pale; vomiting off and on. Holds abdomen very tight; very difficult to examine.

*Under Chloroform.*—Mass felt in left lumbar region. Oil injected; mass reduced in size.

Incision in middle line. Bowels prolapsed from abdomen. Intussusception reduced and bowels returned. Intussusception was of the ileocæcal variety. Abdomen closed in single layer.

2.12.04.—Child very well, taking food well; T. normal.

4.12.04.—Child has had diarrhœa. T. 101; P. 104.

7.12.04.—Child very well. T. normal. Still has slight diarrhœa.

This child was discharged cured 19.12.04.

## CASE OF INTUSSUSCEPTION WHERE GRAPE SEED AND THREAD WORMS WERE FOUND IN APPENDIX

CASE 67.—T. H., aged 10 months. Admitted 4.2.02. At 10 o'clock this morning child had a screaming fit and commenced retching; retched up grape skins. Has passed no motion since. Was given an enema and passed some reddish fluid.

*On Examination.*—T. 101·6; P. 150; R. 54.

*Under Chloroform.*—Intussusception palpated in upper part of abdomen. Attempt made to reduce it with oil. Abdomen opened in middle line. Small portion of intussusception, ileocæcal, still found unreduced. After reduction, appendix found to be very dark. Appendix removed and found to contain a grape seed and two or three small thread worms.

*Later.*—Child restless; T. 103. Given morphia; child did not rest very well.

5.2.02.—Injection this morning; child passed some grape seeds and seemed easier afterwards.

6.2.02.—Another injection last night; passed more skins and seeds; no worms to be seen in motion. Had another good motion this morning after oil. Passed still more seeds and grape skins. Seems much easier. Wound looking well. T. 99; P. 120.

Child was discharged cured 20.2.02.

### SEVERE CASES: PERITONEUM TORN

CASE 104.—M. T., aged 5 months. Admitted 29.6.04.

Child quite well till mid-day yesterday, then commenced vomiting. Cried a little, but no screaming. 9 P.M. yesterday commenced passing blood and slime. Vomiting continued. Child could take no food.

*On Examination.*—Child very pale, pulse rapid and small. *Abdomen.*—A curved tumour readily palpable in left iliac region.

*Under Chloroform.*—Olive oil injected into bowel, but no reduction in size of tumour. Incision made in middle line 2 inches above and 2 inches below umbilicus. Wound bled freely, oozing stopped by ligatures and adrenalin. Almost whole of colon involved in ileocæcal intussusception. Intussusception reduced after some difficulty. Cæcum much discoloured. Peritoneum ruptured in several places. Some of the rents were stitched over; bowels returned into abdomen, which was sutured in a single layer.

1.7.04.—Child very well. Bowels well opened. No distension.

This child made an uneventful recovery and was discharged 17.7.04.

Case 105.—J. P., aged 9 months. Admitted 30.6.04.

Child perfectly well up to mid-day yesterday, then commenced vomiting. Passed blood and slime after injection. At 10 P.M. yesterday cried a good deal. Got very pale after attack came on.

*On Examination.*—Child somewhat pale. Abdomen tense. Tumour felt in right upper hypochondrium.

*Under Chloroform.*—After an injection of oil, incision, 2½ inches long, made on right of rectus. Intussusception withdrawn from abdomen, whole of ascending and part of transverse colon involved. Intussusception reduced by pressure, the last few inches very difficult to reduce. On reduction it was found that the primary intussusception had taken place at the lower end of ileum. Serous coating of cut torn in one place. This was stitched over, and washed with saline solution. Intestines returned to abdomen.

1.7.04.—Child very well. Bowels well opened.

2.7.04.—Wound looks well. Child taking food well. Temperature normal.

12.7.04.—Two silkworm-gut sutures removed. Child very well. Discharged 10 A.M. To come up to be dressed daily.

## Recovery after Resection of 4 Inches of Ileum

Note.—This case was recorded in the *British Medical Journal*, 1897, vol. ii.

Case 14.—P. M'D., aged 11 months. 28.9.96.

I saw this child with Dr. Wood, of Ashfield, on 27.9.96. He had been attending it for eight days. Eight days previously, while the child was being played with by its parent in bed, it suddenly screamed and seemed to be faint; in about 10 minutes it rallied. Soon afterwards it had a motion and vomited, and it vomited a good deal during the day. Had three small motions, all tinged with blood. Dr. Wood could feel no swelling in the abdomen, which was not tender. An enema was administered, which was shortly afterwards returned fæcal-stained.

The next day bowels were opened twice, motions slightly blood-stained; vomiting nearly all day.

During the next three days, the vomiting continued on and off, but the bowels were opened. Motions were blood-stained.

On September 25, child not so well; abdomen more distended. Two discharges of brightish blood from the bowels. Nothing to be felt.

I saw the child for the first time on the evening of the eighth day of illness. It was a good colour and did not look ill. It had not vomited much during the day. Its abdomen was a good deal distended. Its pulse and temperature were under 100. Arrangements made for laparotomy early the following morning.

The operation was performed in a private house. Under the anæsthetic I could feel a tumour in right side of abdomen. Abdomen was opened on the middle line, and the tumour was found to be an intussusception of the ileum into the cæcum. The small intestines were much distended and could not be kept in the abdomen. The intussusception was not easily reduced, and as it was unfolding I could hear and feel that the bowel was tearing. After the reduction was completed I found that a portion of the ileum near the cæcum was torn in several places, so much so and so irregularly, that I felt it would be useless to attempt to mend it by sutures. I therefore resected the damaged portion of the ileum, removing about 4 inches. The cut ends of the bowel were brought together by means of a double row of fine catgut continuous sutures, starting each time from the mesentery.

Before the intestines were returned they were washed with a weak solution of perchloride of mercury. As the intestines were so much distended with gas there was considerable trouble in returning them to the abdomen, and a good deal of strain was put upon the sutured ileum. The abdomen was closed with through-and-through silkworm-gut sutures. The child was very collapsed at the completion of the operation. Strychnine given hypodermically at intervals during the day, and it was fed by nutrient enemata. Brandy by mouth.

Dr. Wood, who had entire charge of the case, afterwards informed me that some black offensive material passed by the bowel in about thirty hours. After this there was a slow but steady improvement, and the child was well in fourteen days.

The cases quoted were all in the Children's Hospital (with the exception of Case 14), and the Notes are the House Surgeon's, copied from the Hospital papers.

# APPENDIX C

## STATISTICS OF THE 144 CASES

THE first case of this series occurred 24.8.93 and the last 26.6.06.

*Sex.*—Males, 83; Females, 61.

*Age.*—Only 14 of these cases were over one year—6½ months being the average age of the rest (130).

And of the 14 over one year—

1 was 15 years
1 „ 11 „
1 „ 10 „
1 „ 9 „
1 „ 7 „
1 „ under 4 years
8 were „ 2 „

Total . 14

*Treatment.*—

124 laparotomies.
14 reduced by injections.
4 died shortly after admission without any operation.
2 died during the administration of chloroform before operation.

Total . 144

### LAPAROTOMIES

| | Cured. | Died. | Mortality. |
|---|---|---|---|
| 124 | 84 | 40 | 32·2 |
| 1st, 50 | 25 | 25 | 50 |
| 2nd, 50 | 38 | 12 | 24 |
| Last, 24 | 21 | 3 | 12·5 |

Average time from onset of symptoms to operation:—

| | In those that lived. | In those that died. |
|---|---|---|
| 1st, 50 | 28 hours. | 68 hours. |
| 2nd, 50 | 23 „ | 48 „ |
| Last, 24 | 17 „ | 42 „ |

Average time from onset of symptoms in those cured by injection—16 hours.

The onset was sudden in 97 per cent of the cases; and it was noticed that blood was passed by the bowel in all the cases but 6.

Among the 40 fatal cases the bowel was resected eight times, most of these only surviving the operation a few hours; there were also 11 other children who never recovered the shock of the operation.

### TABLE SHOWING THE NUMBER OF CASES IN EACH YEAR

| | Cases. | Cured. | Died. |
|---|---|---|---|
| 1893 . . | 1 | 1 | ... |
| 1894 . . | 4 | 2 | 2 |
| 1895 . . | 5 | 2 | 3 |
| 1896 . . | 7 | 4 | 3 |
| 1897 . . | 8 | 6 | 2 |
| 1898 . . | 6 | 4 | 2 |
| 1899 . . | 5 | 1 | 4 |
| 1900 . . | 14 | 7 | 7 |
| 1901 . . | 16 | 9 | 7 |
| Carry forward | 66 | 36 | 30 |

### TABLE SHOWING THE NUMBER OF CASES IN EACH YEAR (*continued*)

| | Cases. | Cured. | Died. |
|---|---|---|---|
| Brought forward | 66 | 36 | 30 |
| 1902 . . | 17 | 11 | 6 |
| 1903 . . | 16 | 12 | 4 |
| 1904 . . | 19 | 16 | 3 |
| 1905 . . | 19 | 16 | 3 |
| 1906 to June 30 | 7 | 7 | ... |
| | 144 | 98 | 46 |

### WHERE THE CASES WERE TREATED

| | |
|---|---|
| 104 | at the Sydney Children's Hospital (now Royal Alexandra Hospital for Children). |
| 21 | at Royal Prince Alfred Hospital. |
| 17 | in various private hospitals. |
| 2 | in private houses. |
| 144 | |

# APPENDIX D

## DETAILS OF 144 CASES OF INTUSSUSCEPTION TREATED BY MR. CLUBBE FROM 24.8.93 TO 26.6.06.

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 24.8.93 | R. C. | M | $\frac{6}{12}$ | 20 hrs. | On left side. | Middle. | Ileocæcal. | Cured. | Serous coat of large bowel torn in several places; some difficulty in returning intestines. |
| 2 | 19.9.94 | I. C. | F | $\frac{4}{12}$ | 48 ,, | Not felt. | ,, | ,, | Died. | Admitted 19.9.94. Typical history. No mass felt. Large enema given. Abdomen opened 24 hours later and cæcum found in colon; difficulty in returning intestines. Child died in 11 hours. Temp. 105. |
| 3 | 10.10.94 | J. L. | M | $\frac{6}{12}$ | 20 ,, | On right side. | ,, | ,, | Cured. | Vomited much after operation. Six days after operation, owing to much redness of skin, some stitches were removed. Next day, when straining or coughing, three inches of gut came through wound. Under anæsthetic this was returned and the peritoneum brought together with through-and-through silkworm-gut sutures. Child did well. |
| 4 | 9.12.94 | I. C. | M | $\frac{4}{12}$ | 72 ,, | In rectum. | ,, | ,, | Died. | Great difficulty in returning intestines; gas from some of these let out. Did not rally after operation. Died in 3 hours. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 20.12.94 | D. G. | M | $\frac{4}{12}$ | 20 hrs. | In rectum. | Middle. | Ileocæcal. | Cured. | Injection had moved the tumour to the transverse colon. The last portion was reduced with great difficulty. |
| 6 | 19.4.95 | R. P. | M | $\frac{3}{12}$ | 16 ,, | On right side. | ,, | ,, | ,, | Easily reduced. Appendix removed. |
| 7 | 5.6.95 | T. H. | M | $\frac{4}{12}$ | 48 ,, | On left side and in rectum. | ,, | ,, | Died. | Child seemed to be doing well for 3 days, then began to fail, and died on the evening of the 4th day. At P.M. some slight peritonitis and enteritis. Cæcum somewhat discoloured. Greater part of small intestine was collapsed. |
| 8 | 19.7.95 | E. G. | M | $\frac{6}{12}$ | 24 ,, | In middle. | ... | ... | Cured. | Passed blood 8 hours after onset of symptoms. Reduced by injection of oil while under anæsthetic. |
| 9 | 9.10.95 | K. R. | F | $\frac{5}{12}$ | 72 ,, | In rectum. | Middle. | Ileocæcal. | Died. | It was impossible to reduce intussusception, which was resected and the ileum sutured to ascending colon. Child died soon after the operation (which only lasted 30 mins.) was completed. |
| 10 | 17.10.95 | O. W. | M | 1 yr.<br>6 mos. | 5 days | On left side. | ,, | Double. | ,, | About 6 inches of ileum was resected. Bowel united with double row of catgut sutures. Child lived 1 hour after operation. |
| 11 | 30.7.96 | E. C. | F | $\frac{5}{12}$ | 48 hrs. | Right side and middle. | ... | ... | Cured. | Blood and slime passed soon after onset. Reduced with oil under anæsthetic. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 6.9.96 | H. H. | M | $\frac{13}{12}$ | 10 hrs. | In transverse colon. | Middle. | Ileocæcal. | Cured. | Three days after operation child was very ill, with high temperature and quick pulse, but ultimately made good recovery. |
| 13 | 25.9.96 | L. T. | F | $\frac{5}{12}$ | 3 days | In rectum and left side. | ,, | ,, | Died. | Reduced with great difficulty; serous coat torn in several places. Child died 12 hours after operation. |
| 14 | 28.9.96 | P. M'D. | M | $\frac{11}{12}$ | 8 ,, | On right side. | ,, | Double. | Cured. | When the mass was reduced the ileum was found to be so torn and damaged, that 4 inches were resected and the cut ends brought together by a double layer of continuous catgut sutures. Child was much collapsed after operation, but ultimately recovered. |
| 15 | 31.10.96 | A. B. | M | $\frac{8}{12}$ | 48 hrs. | Not felt. | ,, | Enteric. | Died. | Reduced after great trouble; much difficulty in returning intestines. Never rallied. Died in 6 hours. |
| 16 | 5.11.96 | V. R. | F | $\frac{15}{12}$ | 12 ,, | On right side. | ... | ... | Cured. | Blood passed soon after onset, which was sudden. Tumour easily felt in the right hypochondrium. Reduced by injection of oil while under chloroform. |
| 17 | 9.11.96 | C. G. | M | $\frac{5}{12}$ | 52 ,, | ,, | Middle. | Ileocæcal. | Died. | Reduced with great difficulty; bowel torn. Tear closed with Lembert's sutures. Child never rallied. Died in 3 hours. |
| 18 | 17.1.97 | R. W. | M | 10 yrs. | 3 days | Across abdomen just below umbilicus. | ,, | ,, | Cured. | Easily reduced. The head of cæcum was thickened and tended to reinvaginate after reduction. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 3.2.97 | S. M. | M | 15 yrs. | 48 hrs. | On right side. | Middle. | Ileocæcal. | Cured. | Easily reduced; cæcum much thickened. Appendix removed. |
| 20 | 22.3.97 | R. H. | M | $\frac{7}{12}$ | 36 ,, | Left side low down. | ,, | ,, | Died. | Appendix removed because gangrenous. Serous coat torn in several places. Child died in 5 hours after operation. |
| 21 | 25.4.97 | H. P. | M | $\frac{8}{12}$ | 6 ,, | Transverse colon. | Middle line. | ,, | ,, | Lived 60 hours; had a convulsion and died with high temperature. |
| 22 | 23.7.97 | S. H. | M | $\frac{5}{12}$ | 36 ,, | On left side. | ,, | ,, | Cured. | This intussusception was apparently reduced by the injection, but in 20 hours, as tumour could again be felt, the abdomen was opened; then intussusception was reduced without difficulty. |
| 23 | 26.9.97 | E. M. | M | $\frac{7}{12}$ | 24 ,, | On right side. | Right side. | ,, | ,, | Reduced without difficulty. The child did well till 4th day, when temp. went to 105, P. 180, R. 60. Next day temperature normal, and after that a quick recovery. |
| 24 | 30.9.97 | A. C. | F | $\frac{6}{12}$ | 7 ,, | Upper part of abdomen. | To right of middle line. | ,, | ,, | Easily reduced. |
| 25 | 9.11.97 | M. T. | F | $\frac{6}{12}$ | 18 ,, | On right side. | ,, | Double. Ileum into cæcum, cæcum into colon. | ,, | Child very ill for a few days, with a high temperature. Subsequently made a good recovery. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 26 | 21.2.98 | R. C. | M | $2\frac{2}{12}$ | 24 ,, | Just above umbilicus and per rectum. | Middle line. | Colic. | ,, | The intussusception was delivered and reduced without much difficulty. It was colon only—beginning just below cæcum. |
| 27 | 20.9.98 | R. C. | M | $2\frac{8}{12}$ | 12 ,, | On left side. | ,, | ,, | ,, | The child had been operated on 6 months previously for intussusception (Case 26). Again it was colon into colon and easily reduced. |
| 28 | 13.10.98 | S. B. | M | $\frac{5}{12}$ | 24 ,, | ,, | To the right of the rectus. | Ileocæcal. | Died. | Reduced with considerable difficulty. Next day temp. 105 ; convulsions. Died 2 hours afterwards. |
| 29 | 22.11.98 | M. S. | F | $\frac{5}{12}$ | 28 ,, | On left side and per rectum. | Middle line. | ,, | ,, | Very great difficulty in reducing the last portion. Serous coat much torn. Never recovered from shock, and died in 4 hours. |
| 30 | 28.11.98 | T. G. | M | 11 yrs. | 3 days | On right side. | ,, | ,, | Cured. | Opening the peritoneum caused profound shock. Mass easily reduced ; the intussusception started at head of cæcum. |
| 31 | 27.12.98 | G. G. | M | 9 ,, | 48 hrs. | ,, | ,, | ,, | ,, | This intussusception was at first apparently reduced by injection, but when it recurred in 18 hours the abdomen was opened. |
| 32 | 5.6.99 | A. N. | F | $\frac{7}{12}$ | 12 ,, | On left. | ... | ... | Died. | The child died a few hours after admission. Too ill for operation. |
| 33 | 26.9.99 | M. M. | F | $\frac{3}{12}$ | 24 ,, | On left side. | Middle. | Double. | ,, | P.M. Cæcum black. Localised peritonitis. |
| 34 | 23.10.99 | E. W. | F | $\frac{7}{12}$ | 4 days | On right. | ,, | Ileo-colic. | ,, | Cæcum resected. Died in 2 hours. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 5.12.99 | K. F. | M | $\frac{10}{12}$ | 24 hrs. | On left. | Middle. | Ileocæcal. | Died. | Lived 16 days. P.M. Found to have peritonitis. |
| 36 | 23.12.99 | H. B. | M | $\frac{5}{12}$ | ... | ... | ,, | ,, | Cured. | |
| 37 | 3.1.00 | A. L. | F | $\frac{4}{12}$ | 12 hrs. | In middle. | ,, | ,, | ,, | |
| 38 | 20.4.00 | F. P. | M | $\frac{10}{12}$ | 10 days | On left. | ,, | Colon into colon. | Died. | Died in 2 days with high temperature. |
| 39 | 6.6.00 | J. W. | F | $\frac{5}{12}$ | 36 hrs. | ,, | ,, | Double. | ,, | P.M. Lower end ileum and cæcum found to be gangrenous. |
| 40 | 10.7.00 | M. B. | F | $\frac{10}{12}$ | 36 ,, | ,, | ,, | Ileocæcal. | ,, | Difficult to reduce. Serous coat torn. |
| 41 | 28.7.00 | F. H. | M | $\frac{6}{12}$ | 24 ,, | On right. | To the right of rectus. | Ileo-colic. | Cured. | |
| 42 | 6.8.00 | A. R. | M | $\frac{5}{12}$ | 56 ,, | On left. | ... | Ileocæcal. | Died. | Cæcum resected. Died in 12 hours. |
| 43 | 9.8.00 | V. O. | F | $\frac{7}{12}$ | 22 ,, | On right. | Middle. | Ileo-colic. | ,, | 9 inches resected. Died in 24 hours. |
| 44 | 5.9.00 | R. G. | F | $\frac{5}{12}$ | 10 ,, | ... | ... | Ileocæcal. | Cured. | |
| 45 | 12.9.00 | K. H. | M | $\frac{8}{12}$ | 24 ,, | Right side. | Right side. | ,, | ,, | Appendix removed. |
| 46 | 18.9.00 | P. T. | F | $\frac{7}{12}$ | 36 ,, | Above umbilicus. | Middle. | Double. | ,, | |
| 47 | 5.10.00 | K. C. | F | $\frac{6}{12}$ | 24 ,, | Middle and left. | ,, | Ileo-colic. | ,, | Reduced easily. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 48 | 9.10.00 | K. M. | F | 1 yr. | 18 ,, | On right. | ,, | ,, | Died. | Had entero-colitis 3 days before intussusception. Died 3 days after operation. |
| 49 | 29.10.00 | F. P. | F | 1 ,, | 3 days | On right extending across middle line. | ,, | Double. | Cured. | |
| 50 | 20.11.00 | C. W. | M | $\frac{10}{12}$ | 36 hrs. | On left. | ,, | Ileocæcal. | Died. | Very difficult to reduce ; never rallied from operation. Died in 14 hours. |
| 51 | 4.1.01 | E. C. | F | $\frac{10}{12}$ | 4 days | On right. | To the right of rectus. | Ileo-colic. | ,, | Child much distended ; intussusception small. Child died in 3 hours. |
| 52 | 12.1.01 | J. M. | M | $\frac{7}{12}$ | 13 ,, | On left and in rectum. | Middle. | Ileocæcal. | ,, | Bowel much torn ; 18 inches resected. Only lived 1 hour after operation. |
| 53 | 12.1.01 | D. N. | F | $\frac{5}{12}$ | 2 ,, | Above umbilicus. | ,, | ,, | ,, | Took anæsthetic badly. Died in 8 hours. |
| 54 | 22.2.01 | N. O'C. | F | $\frac{8}{12}$ | 3 ,, | On right side. | ... | ... | ,, | Child admitted with temp. 104·2 ; pulse running ; too ill for operation. Died in a few hours after admission. |
| 55 | 9.4.01 | E. G. | M | $\frac{5}{12}$ | 18 hrs. | In rectum. | Middle. | Ileocæcal. | Cured. | |
| 56 | 30.4.01 | A. N. | F | $\frac{8}{12}$ | 12 days | On left side low down. | Right of rectus. | ,, | ,, | Reduced easily. Chronic form. |
| 57 | 4.6.01 | A. U. | M | $\frac{9}{12}$ | 12 hrs. | In middle. | ... | ... | Died. | Child died from $CHCl_3$ poisoning before operation was commenced. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 58 | 16.7.01 | W. L. | M | $\frac{7}{12}$ | 48 hrs. | On left. | Middle line. | Ileocæcal. | Died. | Intussusception resected. Took anæsthetic badly. Only lived 4 hours. |
| 59 | 17.7.01 | E. H. | F | $\frac{6}{12}$ | 48 ,, | On right and towards middle. | Right side. | ,, | Cured. | |
| 60 | 27.7.01 | W. L. | M | $2\frac{3}{12}$ | 12 ,, | On left. | Middle. | Double. | ,, | |
| 61 | 11.9.01 | W. M. | F | $\frac{5}{12}$ | 12 ,, | On right. | To right of rectus. | Ileo-colic. | ,, | Appendix much nipped, but it was not removed. |
| 62 | 16.9.01 | W. A. | M | $\frac{5}{12}$ | 7 ,, | Hepatic flexure. | ... | ... | ,, | Passed blood soon after onset. Mass felt at hepatic flexure. Child very white; pulse small and quick. Reduced by injection of oil while under chloroform. |
| 63 | 27.9.01 | I. M. | M | $\frac{10}{12}$ | 20 ,, | Right side. | On right side. | Ileocæcal. | ,, | |
| 64 | 19.10.01 | M. C. | M | $\frac{10}{12}$ | 10 days | In middle. | Middle. | ,, | ,, | A chronic form. |
| 65 | 22.11.01 | F. B. | M | $\frac{6}{12}$ | 24 hrs. | On right side. | Middle line. | Double. | ,, | |
| 66 | 24.11.01 | L. K. | M | $\frac{7}{12}$ | 50 ,, | On left. | ,, | Ileocæcal. | Died. | The child was collapsed before operation—pulse 184. Did not get over shock. Died in 3 hours. |
| 67 | 4.2.02 | T. H. | M | $\frac{10}{12}$ | 11 ,, | On right. | ,, | ,, | Cured. | Appendix removed and found to contain grape stone and some thread worms. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 68 | 5.3.02 | J. P. | F | $\frac{5}{12}$ | 24 ,, | On left side and in rectum. | ,, | ,, | ,, | Mass very slightly reduced by injection, but not tight. |
| 69 | 22.3.02 | A. S. | F | $\frac{5}{12}$ | 20 ,, | Sigmoid. | Middle. | Double. | ,, | Cæcum much thickened. (The Ileocolic-Ileocæcal variety.) |
| 70 | 2.4.02 | R. S. | M | $\frac{6}{12}$ | 16 ,, | On right side. | ,, | Ileo-colic. | Died. | Recovered from operation and seemed to be doing well, but died on the 5th day with colitis. |
| 71 | 24.4.02 | F. M. | M | $\frac{4}{12}$ | 5 days | On left side. | ... | ... | ,, | On admission, pale and collapsed. Temp. 104. Too ill for operation. Died in 4 hours. |
| 72 | 10.5.02 | A. J. | F | $\frac{4}{12}$ | 26 hrs. | In rectum. | Middle line. | Ileocæcal. | Cured. | Mass outside anus. Injection did not remove it. At operation finger had to be introduced to get it out of rectum. Cæcum dark and rough. |
| 73 | 15.5.02 | A. S. | F | $\frac{7}{12}$ | 4 ,, | On right side. | Right. | Ileo-colic. | ,, | This child was operated on two months ago. The abdomen opened again on right side through scar. Omentum found adherent. |
| 74 | 29.7.02 | A. H. | M | $\frac{6}{12}$ | 12 ,, | Hepatic flexure. | Middle line. | Ileocæcal. | ,, | |
| 75 | 2.9.02 | M. D. | F | $\frac{4}{12}$ | 7 ,, | On right side. | Right of rectus. | ,, | ,, | |
| 76 | 2.9.02 | T. D. | F | $\frac{11}{12}$ | 36 ,, | On left side. | Right side. | Ileo-colic. | ,, | Peritoneal surface of the ileum was much damaged. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 77 | 28.9.02 | N. C. | M | $\frac{7}{12}$ | 48 hrs. | In sigmoid and rectum. | Middle line. | Ileocæcal. | Died. | Reduced through whole colon with much difficulty. Died in 12 hours with high temperature. |
| 78 | 28.9.02 | O. B. | F | $\frac{7}{12}$ | 30 ,, | In transverse colon. | ,, | ,, | Cured. | Considerable force had to be used to unfold this intussusception. |
| 79 | 4.10.02 | A. B. | M | $\frac{12}{12}$ | 24 ,, | In rectum. | ,, | ,, | ,, | The last part was reduced with difficulty. |
| 80 | 7.10.02 | G. B. | M | $\frac{12}{12}$ | 24 ,, | On right side. | Border of rectus. | Ileo-colic. (Double.) | Died. | Child much collapsed. P. 200. Fluid motions passed constantly, very little blood. Ileum much damaged. Child too ill for resection. |
| 81 | 7.11.02 | A. W. | F | $\frac{5}{12}$ | 40 ,, | ,, | Middle line. | ,, | ,, | Child drowsy. P. 190. Very difficult to reduce. Died in 14 hours. |
| 82 | 21.11.02 | A. B. | M | $\frac{4}{12}$ | 26 ,, | In D-colon. | ,, | Ileocæcal. | Cured. | Very tight indeed, reduced with much difficulty ; much prolapse of intestines. |
| 83 | 23.12.02 | W. S. | M | 3 yrs. | 4 days | ,, | ,, | Double. | Died. | Child only lived 3 hours. Blue and collapsed before operation. |
| 84 | 8.2.03 | J. M. | M | $\frac{8}{12}$ | 23 hrs. | In T-colon. | ,, | Ileocæcal. | Cured. | |
| 85 | 14.2.03 | J. G. | M | $\frac{10}{12}$ | 12 ,, | In rectum. | ... | ... | ,, | The intussusception was reduced by an injection of oil while under chloroform. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 86 | 17.5.03 | G. R. | F | $\frac{7}{12}$ | 24 ,, | On right. | On right. | Ileo-colic. | ,, | Three inches of ileum much damaged. |
| 87 | 18.7.03 | H. C. | F | $\frac{13}{12}$ | 24 ,, | Below liver. | ... | ... | ,, | Under anæsthetic reduced by injection of oil. |
| 88 | 31.7.03 | B. K. | F | $\frac{9}{12}$ | 24 ,, | Left side. | Middle line. | Double. | Died. | Small intestine much damaged. |
| 89 | 17.8.03 | M. H. | F | $\frac{6}{12}$ | 12 ,, | T-colon. | ,, | Ileocæcal. | Cured. | Much difficulty with prolapsed intestine. |
| 90 | 21.8.03 | E. M. | M | $\frac{5}{12}$ | ? | In rectum and on left side. | ... | ... | ,, | Child became suddenly ill 7 days ago, screaming and vomiting. Bowels well open with medicine next day; since then only passing blood and slime. Under anæsthetic oil injected, intussusception reduced. |
| 91 | 21.9.03 | S. M. | F | $\frac{6}{12}$ | 3 days | On left side in rectum. | Middle line. | Double. | Died. | 18 inches of colon and 4 inches of ileum resected. Died in 2 hours. |
| 92 | 10.10.03 | V. M. | M | $\frac{7}{12}$ | 18 hrs. | T-colon. | At right of rectus. | Double. Ileum into ileum. | Cured. | Very tight; ileum much discoloured. |
| 93 | 13.10.03 | R. F. | M | $\frac{10}{12}$ | 6 ,, | ,, | Right. | Ileocæcal. | ,, | Reduced easily. Much thickening of ileum. |
| 94 | 17.10.03 | J. H. | M | $\frac{6}{12}$ | 18 ,, | ,, | Middle line. | Double. | ,, | Ileum in ileum first. (The Enteric-Ileocæcal variety.) |
| 95 | 23.10.03 | I. W. | F | $\frac{9}{12}$ | 18 ,, | On left side. | ,, | Ileocæcal. | Died. | Pulse slow (92) before operation. Intussusception much congested; very tight. |
| 96 | 26.10.03 | A. C. | M | $\frac{5}{12}$ | ? | On right side. | ... | ... | Cured. | Reduced by injection of oil under anæsthetic. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 97 | 11.11.03 | M. W. | F | $\frac{9}{12}$ | 26 hrs. | Hepatic flexure. | ... | ... | Cured. | Passed blood 2 hours after onset. Under anæsthetic mass felt at hepatic flexure reduced with oil. |
| 98 | 1.12.03 | F. L. | F | $\frac{7}{12}$ | 30 ,, | In T-colon. | Middle line. | Double. | ,, | Mass reduced with great difficulty. Peritoneum split in several places. |
| 99 | 21.12.03 | M. H. | F | $\frac{6}{12}$ | 6 days | On left side and in rectum. | ... | ... | Died. | Child too ill for operation. Died a few hours after admission. |
| 100 | 15.2.04 | E. A. | M | $\frac{9}{12}$ | 50 hrs. | On left. | To right of rectus. | Ileocæcal. | ,, | Lived 48 hours. Died with high temperature and rapid pulse. |
| 101 | 16.2.04 | C. M. | M | $\frac{6}{12}$ | 8 ,, | T-colon. | Middle line. | ,, | Cured. | Easily reduced. |
| 102 | 17.2.04 | J. P. | M | $\frac{4}{12}$ | 24 ,, | On left side and in rectum. | ,, | ,, | ,, | Not properly anæsthetised. All intestines prolapsed, reduced with difficulty. Peritoneum torn. |
| 103 | 19.3.04 | I. E. | F | $\frac{5}{12}$ | 6 ,, | Hepatic flexure. | ... | ... | ,, | Intussusception reduced by injection of oil under anæsthetic. |
| 104 | 29.6.04 | M. T. | F | $\frac{5}{12}$ | 30 ,, | In sigmoid. | Middle line. | Ileocæcal. | ,, | Mass reduced with great difficulty; intestine much damaged. |
| 105 | 30.6.04 | J. P. | M | $\frac{9}{12}$ | 24 ,, | At hepatic flexure. | On right of rectus. | Double. | ,, | Much difficulty in reducing completely. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 20.7.04 | J. D. | M | $\frac{10}{12}$ | 12 ,, | T-colon. | Right of rectus. | ,, | ,, | Last part of ileum very tight. |
| 107 | 28.7.04 | T. M. | M | $1\frac{10}{12}$ | 8 ,, | Hepatic flexure. | ... | ... | ,, | Under $CHCl_3$ olive oil was injected. Mass disappeared. |
| 108 | 12.8.04 | J. C. | M | $\frac{6}{12}$ | 24 ,, | ,, | Right of rectus. | Ileo-colic. | ,, | Reduced easily. |
| 109 | 12.8.04 | A. B. | F | $\frac{8}{12}$ | 4 days | In T-colon. | Middle line. | Double. | Died. | Intussusception began in ileum 8 inches above cæcum. Not much swelling. Peritoneum dry and sticky. Died in 2 hours. |
| 110 | 24.8.04 | W. A. | M | $\frac{8}{12}$ | 12 hrs. | Hepatic flexure. | ,, | ,, | Cured. | Began in ileum 2 inches above cæcum. Mass very large and hard. Very tight. |
| 111 | 2.10.04 | H. D. | M | $\frac{4}{12}$ | 48 ,, | In left side of rectum. | ,, | Ileocæcal. | ,, | Reduced by injection to splenic flex. All intestines out. Reduced fairly easily. |
| 112 | 5.10.04 | G. F. | M | $\frac{5}{12}$ | 8 ,, | T-colon. | Right of rectus. | ,, | ,, | Reduced by oil to cæcum. |
| 113 | 19.10.04 | M. S. | F | $\frac{9}{12}$ | 24 ,, | On left side. | Middle line. | ,, | ,, | Not much reduced by oil. Tight. Peritoneum torn and sutured. |
| 114 | 3.11.04 | G. W. | M | $\frac{6}{12}$ | 18 ,, | ,, | ,, | ,, | ,, | Very large long mass from rectum to T-colon —very little reduced by injection. |
| 115 | 11.11.04 | A. B. | M | $\frac{9}{12}$ | 20 ,, | T-colon. | Right of rectus. | ,, | ,, | Reduced with oil, except dimple at head of cæcum—this was kept up with difficulty. |
| 116 | 11.11.04 | C. P. | M | $\frac{9}{12}$ | 12 ,, | On left side. | Middle line. | ,, | ,, | Very tight. Peritoneum torn. Many retrograde intussusceptions in the small intestines. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 117 | 30.11.04 | A. B. | F | $\frac{8}{12}$ | 24 hrs. | Left side. | Middle. | Ileocæcal. | Cured. | Reduced easily. |
| 118 | 3.12.04 | R. H. | F | $\frac{4}{12}$ | 4 days | ,, | ,, | ,, | Died. | Lived 26 days, then died from gastro-enteritis. |
| 119 | 24.2.05 | M. S. | F | $\frac{7}{12}$ | 20 hrs. | Hepatic flexure. | Right of rectus. | Double. | Cured. | Ileum prolapsed through valve first, then cæcum folded in. |
| 120 | 27.2.05 | L. B. | M | $\frac{4}{12}$ | 12 ,, | On left side. | Middle line. | Ileocæcal. | ,, | Serous coat torn. Intestines all out. |
| 121 | 8.3.05 | S. J. | F | $\frac{5}{12}$ | 24 ,, | Low down in middle of abdomen. | ,, | ,, | Died. | Very large hard mass, lying right across abdomen. Intestines all prolapsed, returned with difficulty. Stitch abscess. Died on 5th day G.P. |
| 122 | 1.4.05 | H. R. | M | $\frac{9}{12}$ | 68 ,, | On left side in rectum. | ,, | Double. | Cured. | Reduced by oil to hepatic flexure. Intussusception began in ileum 4 inches above cæcum. |
| 123 | 23.4.05 | H. B. | M | $\frac{4}{12}$ | 6 ,, | On right. | Right of rectus. | Ileocæcal. | ,, | |
| 124 | 1.5.05 | W. J. | F | $\frac{4}{12}$ | 24 ,, | In left side. | Middle line. | Ileo-colic. (Double.) | ,, | Retrograde intussusception in colon. |
| 125 | 4.5.05 | B. M. | M | $\frac{7}{12}$ | 48 ,, | On left side. | ... | ... | Died. | Died during administration of chloroform, before operation was commenced. |
| 126 | 23.5.05 | E. C. | M | $\frac{7}{12}$ | 20 ,, | Right side. | Right of rectus. | Ileocæcal. | Cured. | Catgut sutures gave way on 4th day; wound then closed with through-and-through silkworm-gut. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 127 | 17.7.05 | K. S. | M | $\frac{8}{12}$ | 24 ,, | In T-colon. | ,, | Double. | ,, | Reduced with much difficulty. Six inches of ileum first intussuscepted. |
| 128 | 15.8.05 | H. F. | F | $\frac{5}{12}$ | 7 ,, | In middle of rectus. | Right. | Ileocæcal. | ,, | |
| 129 | 27.8.05 | L. M. | F | $\frac{9}{12}$ | 24 ,, | On right side. | Middle line. | Double. | ,, | The intussusception began in ileum 10 inches above cæcum. |
| 130 | 9.9.05 | E. W. | M | $\frac{4}{12}$ | 10 ,, | In T-colon. | ,, | Ileocæcal. | ,, | Blood appeared very shortly after onset. |
| 131 | 19.10.05 | D. M. | M | $\frac{8}{12}$ | 6 ,, | On right. | In middle line. | Double. | ,, | Began in ileum about 2 inches above cæcum. |
| 132 | 20.10.05 | A. F. | M | $\frac{6}{12}$ | 26 ,, | On left. | Right of rectus. | Ileocæcal. | ,, | Intestines prolapsed. Easily reduced when mass once delivered. |
| 133 | 22.10.05 | A. B. | M | $\frac{5}{12}$ | 30 ,, | On right. | On right. | ,, | ,, | Much difficulty in reducing prolapsed intestines. |
| 134 | 12.11.05 | A. W. | M | $3\frac{6}{12}$ | 8 ,, | On right side. | ... | ... | ,, | Mass disappeared after injection of oil while under anæsthetic. |
| 135 | 13.11.05 | G. L. | F | $\frac{6}{12}$ | 8 ,, | On left. | Middle line. | Ileocæcal. | Died. | Caput cæci the last to unfold. Died on 9th day, stitch abscess communicating with peritoneum. |
| 136 | 18.11.05 | P. L. | F | $\frac{8}{12}$ | 10 ,, | ,, | ,, | Double. | Cured. | |
| 137 | 19.11.05 | H. K. | M | $\frac{6}{12}$ | ? | ,, | Middle. | Ileocæcal. | ,, | The intussusception occurred during an attack of colitis. Difficult to reduce. All intestines out. |

| No. | Date. | Name. | Sex. | Age. | Duration. | Situation of Tumour. | Incision. | Variety. | Result. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 138 | 5.2.06 | N. H. | F | $\frac{16}{12}$ | 12 hrs. | On right. | Right of rectus. | Ileocæcal. | Cured. | |
| 139 | 24.2.06 | T. J. | F | $\frac{8}{12}$ | 18 ,, | Middle. | ... | ... | ,, | Reduced with oil while under anæsthetic. |
| 140 | 6.3.06 | M. O. | F | $\frac{10}{12}$ | 28 ,, | Left side. | Middle. | Double. | ,, | |
| 141 | 16.3.06 | J. W. | M | $\frac{5}{12}$ | 6 ,, | Just below liver. | ... | ... | ,, | Reduced with oil while under anæsthetic. |
| 142 | 19.4.06 | R. D. | M | $\frac{10}{12}$ | 8 ,, | Middle. | Middle. | Double. | ,, | Not properly under anæsthetic. All intestines out. Began in ileum 3 inches above cæcum. |
| 143 | 27.5.06 | D. N. | F | $\frac{5}{12}$ | 17 ,, | In T-colon. | Middle line. | Ileocæcal. | ,, | Took anæsthetic badly. All intestines prolapsed. Easily reduced. |
| 144 | 26.6.06 | E. C. | F | $\frac{5}{12}$ | 40 ,, | Not felt. | Middle. | Double. | ,, | Child much distended. No mass could be felt, even under anæsthetic. No injection given. Bowels prolapsed. Ileum into ileum 8 inches from cæcum. This prolapsed through cæcum, and could be felt in colon when the cæcum was unfolded. |

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